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FHWA/IN/JHRP-92/18

Final Report

ENGINEERING SOILS MAP OF WAYNE COUNTY, INDIANA

Wei-Yao Chen

PURDUE UNIVERSITY

JOINT HIGHWAY RESEARCH PROJECT

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FINAL REPORT

ENGINEERING SOILS MAPS OF WAYNE COUNTY, INDIANA

by

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Joint Highway Research Project

Project No.: C-36-51

File No. 1-5-2-90

Prepared as Part of an Investigation

Conducted by
Joint Highway Research Project
Engineering Experiment Station
Purdue University

in cooperation with

Indiana Department of Transportation
Indianapolis, Indiana

School of Civil Engineering
Purdue University
West Lafayette, Indiana

April 12, 1992

ACKNOWLEDGMENTS

The author wishes to express his appreciation to Professor C. W. Lovell for providing the opportunity to work on this project.

Thanks are also due the members of the Joint Highway Research Board for their continued support of the county soil mapping project.

Credit should be given to Dr. Arvind Chaturvedi for preparing the draft of engineering soil map of Wayne County and many of the figures included in this report.

The author also wishes to acknowledge D. Yang for skillfully drafting the Engineering Soil Map of Wayne County and other figures included in this report, Rita Pritchett and Mary Hardway for typing the classification test results presented in Appendix A, and Will McDermott for formatting the text and final preparation of this report.

Additionally, the author would like to thank his parent and wife for their unending encouragement and financial support.

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ENGINEERING SOILS MAP
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INTRODUCTION

The engineering soils map of Wayne County, Indiana that accompanies this report was prepared by airphoto interpretation techniques using accepted principles of observation and inference. The 7-inch x 9-inch aerial photographs used in this study were taken in the summer of 1940 for the United States Department of Agriculture. The airphotos have an approximate scale of 1:20,000, and the attached Engineering Soil Map was prepared at a scale ratio of 1:63,360 (1 inch = 1 mile).

Standard symbols were developed by the staff of the Airphoto Interpretation Laboratory of the School of Civil Engineering at Purdue University, and they were employed to delineate landform-parent material associations and soil textures. Extensive use was made of the Agricultural Soil Survey of Wayne County published in 1987 (1). It was particularly useful as a cross-reference to check soil boundaries, and to locate gravel pits and ponds that were not present on the 1940 aerial photographs.

The text of this report supplements the Engineering Soil Map. It includes general descriptions of the study area, and the different landform-parent material regions. Engineering considerations associated with each region are also briefly addressed.

The map and report are part of a continuing effort to complete a comprehensive soil survey for the state of Indiana. Included on the map is a set of subsurface soil profiles that illustrate the approximate variation of the soils in each landform-parent material area. The profiles were constructed from information obtained from agricultural literature and from boring data collected from roadway and bridge site investigations (33-48)[1]. Boring locations are shown on the map. Appendix A contains a summary of boring data and classification test results for these locations. The physical, chemical, and engineering index properties of these soils are included in Appendices B and C. Lastly, useful correlations for estimating soil properties are collected in Appendix E.

[1]Numbers in parentheses refer to list of references.

DESCRIPTION OF THE AREA

GENERAL

Wayne County is located centrally along the eastern border of the State of Indiana as illustrated in Figure 1. The county was established in 1810 and named after General Anthony Wayne, an American Revolutionary hero. He was known for his victories over the Indians, especially for the Battle of Fallen Timbers near Toledo in 1794 (2). The county is bordered by the State of Ohio on the east, by Union and Fayette Counties on the south, by Henry County on the west, and by Randolph County on the north. The county government is located at Richmond, which is about 68 miles east of Indianapolis. The county is about 22 miles wide (east-west) by 20 miles long (north-south), and consists of an area of 258,682 areas, or 404 square miles (1).

Wayne County is served by 4 railroads and a public airport. The airport is located south of Richmond, near Boston. The county also has about 23 miles of interstate highways, 130 miles of other federal highways and state highways, and 768 miles of county roads (1). The U.S. Highway 27 and Indiana Highways 1 and 227 are the major roads in north-south direction, whereas Indiana Highways 38 and U.S. Highways 35, 40 and 70 are in east-west direction. Most of the public roads in the county are paved (1).

The population of Wayne County was about 76,000 in 1980. The population density was 188 people per square mile. Richmond, the county seat, has a population of about 41,000. A population summary of the important cities and towns in the county is given in Table 1.

Farming is the leading enterprise in the county. Cash grain and livestock are the major products. Corn, soybean, and wheat are the major crops. The major kinds of livestock are hogs, beef cattle, and dairy cows (1). Approximately 90 % of the acreage in the county is farmland. From 1958 to 1975, the acreage used under urban development

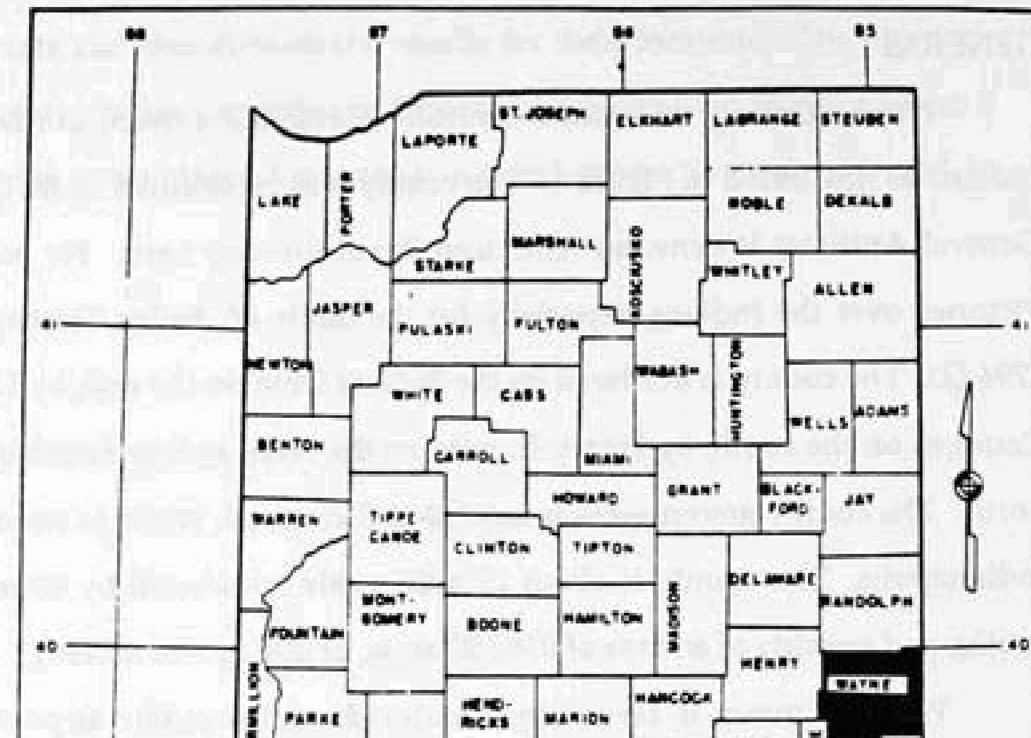


FIGURE 1. LOCATION MAP OF WAYNE COUNTY

Table 1. Population Summary of Wayne County (3)

	Population		Population Change (1970-1980)	
City-Town	1980 Census	1970 Census	Difference	% Change
Boston	189	210	-21	-10.00
Cambridge City	2407	2481	-74	-2.98
Centerville	2284	2380	-96	-4.03
Dublin	979	1021	-42	-4.11
East Germantown	438	447	-9	-2.01
Economy	237	285	-48	-16.84
Fountain City	839	852	-13	-1.53
Greensfork	426	444	-18	-4.05
Hagerstown	1950	2059	-109	-5.29
Milton	729	694	35	5.04
Mt. Auburn	192	157	35	22.29
Richmond	41349	43999	-2650	-6.02
Spring Grove	469	437	32	7.32
Whitewater	107	111	-4	-3.60
Urban Areas	52595	55577	-2982	-5.37
Rural Areas	23463	23532	-69	-0.29
County Total	76058	79109	-3051	-3.86

increased by 1 %. In 1982, the county had approximately 47,000 acres of urban and built-up land (1).

CLIMATE

Wayne County is cold in winter but quite hot in summer (1). Table 2 and 3 give data on temperature and precipitation for this area as recorded at Richmond and Cambridge City, Indiana, respectively. In summer the average temperature is 71 degrees F, whereas in winter is 28 degrees. The highest and lowest temperature recorded in Wayne County are 102 degrees in 1952 and -28 degrees in 1963, respectively (1). The annual precipitation is about 39.3 inches, and 55 percent of this usually falls in April through September. Thunderstorms occur on about 45 days each year (1). The heaviest 1-day rain fall recorded was 4.19 inches at Cambridge City on July 20, 1969 (1).

Average seasonal snowfall is about 23 inches. On the average, 16 days of the year have at least 1 inch of snow on the ground. The average relative humidity is about 60 percent in mid-afternoon, and 85 percent at dawn. The prevailing wind is from the southwest with the highest average wind speed, 11 miles per hour, occurring in the winter (1).

DRAINAGE FEATURES

The county is drained by 2 major river systems. The eastern third of the county is drained by the East Fork of Whitewater River System, whereas the western two-thirds of the county is drained by the West Fork of Whitewater River and its tributaries such as Martindale Creek, Greens Fork, Nolands Fork. Both river systems belong to Whitewater River System with a general drainage trend to the southwest. The drainage features of Wayne County are shown in Figure 2.

Table 2. Climatological Summary for Wayne County (4)

Temperature in °F ; Precipitation in inches

Monthly statistics at Richmond

Year		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1978	TMAX	24.7	26.9	43.3	62.0	69.1	81.3	82.9	81.8	80.2	61.7	53.5	41.1
	TMIN	6.6	2.6	23.8	37.1	48.5	57.8	61.4	60.4	54.9	37.5	33.6	25.0
	PREC	3.75	0.24	2.24	3.57	4.84	4.05	3.32	5.38	[illegible]	[illegible]	2.26	5.58
	SNOW	27.7	2.4	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
1979	TMAX	26.6	27.6	52.7	58.1	[illegible]	80.9	81.5	79.8	76.4	62.8	51.0	42.8
	TMIN	10.3	6.3	32.4	36.6	47.0	55.1	61.7	61.3	52.8	41.9	32.5	25.6
	PREC	2.67	2.76	1.90	3.82	3.49	4.39	10.45	8.95	2.74	2.53	5.32	2.49
	SNOW	16.1	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1980	TMAX	34.9	31.9	45.0	59.2	[illegible]	79.5	86.9	85.9	79.8	60.7	48.7	39.2
	TMIN	20.8	14.4	26.8	37.2	49.1	55.0	64.8	65.3	54.7	38.1	30.2	23.1
	PREC	1.76	1.65	4.55	2.49	5.57	6.52	3.51	6.57	1.54	2.26	1.43	1.17
	SNOW	4.3	8.4	1.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	5.6	2.6
1981	TMAX	[illegible]	[illegible]	48.6	66.3	68.4	82.5	81.6	81.8	73.4	63.1	52.9	35.5
	TMIN	13.8	22.3	27.7	42.6	47.2	60.1	61.2	59.9	51.5	39.8	31.7	20.3
	PREC	0.18	3.11	1.87	4.96	7.00	2.93	5.34	3.29	1.57	2.72	1.99	3.55
	SNOW	1.8	1.1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	11.1
1982	TMAX	30.0	34.8	50.0	58.0	79.0	76.9	86.0	80.7	75.2	67.0	52.6	47.0
	TMIN	8.3	17.2	27.8	34.1	53.3	52.9	62.0	57.4	52.1	43.2	34.2	32.1
	PREC	6.03	2.46	5.12	1.93	4.04	3.30	1.09	6.47	1.27	1.03	4.54	4.05
	SNOW	5.9	7.2	2.5	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1983	TMAX	36.6	43.8	52.4	56.5	68.0	83.3	89.3	89.3	80.1	64.3	52.9	29.3
	TMIN	22.4	24.0	32.0	36.6	45.1	57.1	63.5	63.7	52.1	44.3	34.4	14.6
	PREC	1.90	0.68	1.92	3.85	3.91	3.71	1.48	1.71	1.43	6.27	4.88	2.83
	SNOW	2.8	1.6	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.7
1984	TMAX	29.9	46.0	40.5	58.7	68.6	85.7	81.7	83.6	73.7	69.0	50.0	48.0
	TMIN	14.4	26.9	22.9	39.2	46.4	61.1	58.0	61.0	52.1	50.6	30.7	29.8
	PREC	1.20	2.28	2.66	4.59	4.48	2.36	3.10	2.71	6.45	4.46	3.17	4.62
	SNOW	5.6	12.6	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	3.0
1985	TMAX	27.7	34.9	54.1	68.6	74.5	77.9	83.8	80.7	79.3	67.4	53.8	32.8
	TMIN	12.8	13.1	32.2	42.6	50.7	56.0	61.0	59.8	51.7	45.8	39.4	14.2
	PREC	1.15	2.49	5.95	1.52	5.41	3.44	5.18	2.04	0.74	2.63	8.92	2.54
	SNOW	7.2	10.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3
1986	TMAX	37.5	39.0	53.8	65.6	73.5	81.1	85.8	81.3	79.2	63.7	46.4	38.7
	TMIN	19.8	23.7	31.3	40.9	53.3	60.7	64.8	58.1	58.0	45.7	32.4	26.4
	PREC	1.44	5.73	2.55	3.74	2.70	4.45	4.80	2.63	4.70	8.66	3.06	1.64
	SNOW	5.5	11.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1987	TMAX	33.8	42.2	54.2	62.0	79.7	81.1	85.8	81.3	79.1	59.6	55.7	40.9
	TMIN	21.0	24.6	31.3	39.7	53.4	60.7	64.8	58.1	52.4	34.4	35.6	27.8
	PREC	1.02	1.15	1.74	2.71	4.19	4.45	4.80	2.63	0.62	1.35	2.69	3.11
	SNOW	2.3	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
1988	TMAX	33.6	35.2	49.7	63.3	[illegible]	84.3	88.6	87.3	76.1	56.7	51.8	39.2
	TMIN	15.4	17.0	30.1	36.7	48.9	54.5	63.7	63.9	52.9	34.1	33.4	20.8
	PREC	1.46	3.94	2.84	3.00	1.08	1.09	3.41	2.27	2.50	2.55	5.08	2.08
	SNOW	0.6			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.8

Table 3. Twenty Four Year Normal Climate Data (1)

(Recorded in the period 1951-74 at cambridge City, Indiana)

For The Period 1951-74				
	Temperature (F)			Average Precipitation
MONTH	Average daily maximum	Average daily Minimum	Average	(inches)
January	35.4	16.1	25.7	2.65
February	38.6	18.8	28.7	2.38
March	48.0	26.9	37.5	3.41
April	61.9	38.2	50.1	4.08
May	72.4	47.7	60.1	4.44
June	81.7	56.7	69.2	4.08
July	85.5	60.1	72.8	4.02
August	84.5	57.6	71.0	2.78
September	78.7	50.6	64.7	2.88
October	67.1	39.0	53.1	2.37
November	50.9	30.1	40.5	3.27
December	39.1	21.2	30.2	2.94
Annual	62.0	38.6	50.3	----

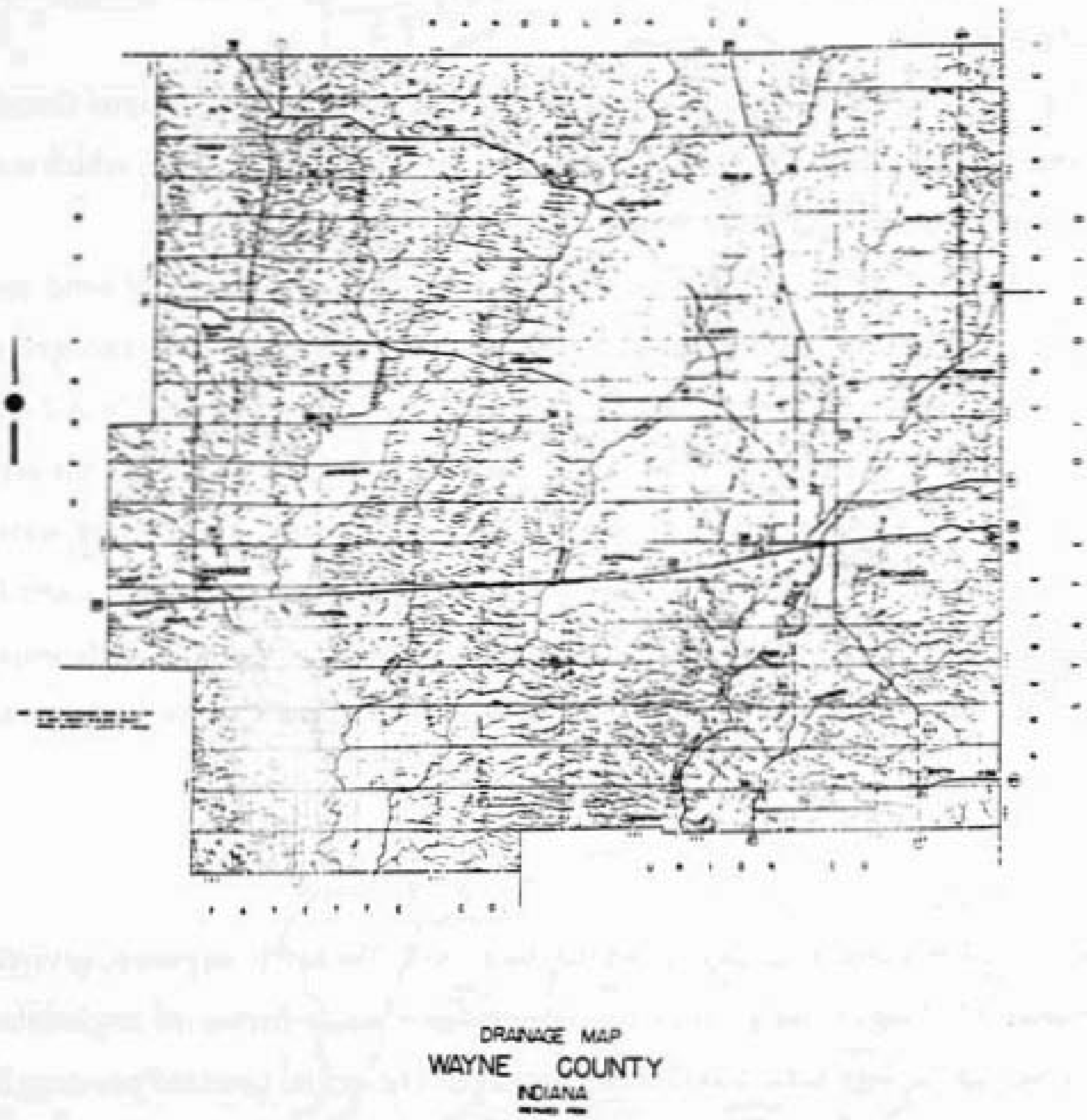


FIGURE 2. DRAINAGE MAP OF WAYNE COUNTY (5)

WATER SUPPLY

Wayne County lies entirely within the Whitewater River watershed (Figure 3). No large lakes exist in the county, but ponds of various origins can be seen in some parts of the county (5).

The major water resource in Wayne County is groundwater (1). Wayne County is situated in the Southern Till Plain Section except the southeastern corner, which is in Ordovician Limestones and Shales Section (Figure 4).

The major aquifers in the Wayne County are the deep deposits of sand and gravel, the seams of sand and gravel in the glacial drift, and the sand and gravel overlying the limestone of Ordovician age. These aquifers are highly variable in depth and lateral extent. In a few localities where glacial drift is too thin such as the area south of Richmond, groundwater supply has been inadequate. The surface water resources are limited in Wayne County. The only major source of surface water is Middlefork Reservoir (5). The town of Richmond obtained 50 percent of its water supply from this reservoir. The water use summary for Wayne County is shown in Table 4.

PHYSIOGRAPHY

The State of Indiana can be divided into two areas. The northern potion, covered by glacial drift, belongs to the great Central Lowland province, whereas the unglaciated southern section belongs to the Low Plateau province. The central Lowland province in Indiana can be further subdivided into two portions. The northern section, including Northern Moraine and Lake Region, is characterized by lakes and lake-bed deposits, whereas the southern portion (Tipton Till Plain) consists of level or undulating deposits of drift without lakes or appreciable stream dissection (8). The northern part of Wayne County is located in the Tipton Till Plain, whereas the southern part is in the Dearborn Upland physiographic region (Figure 5).

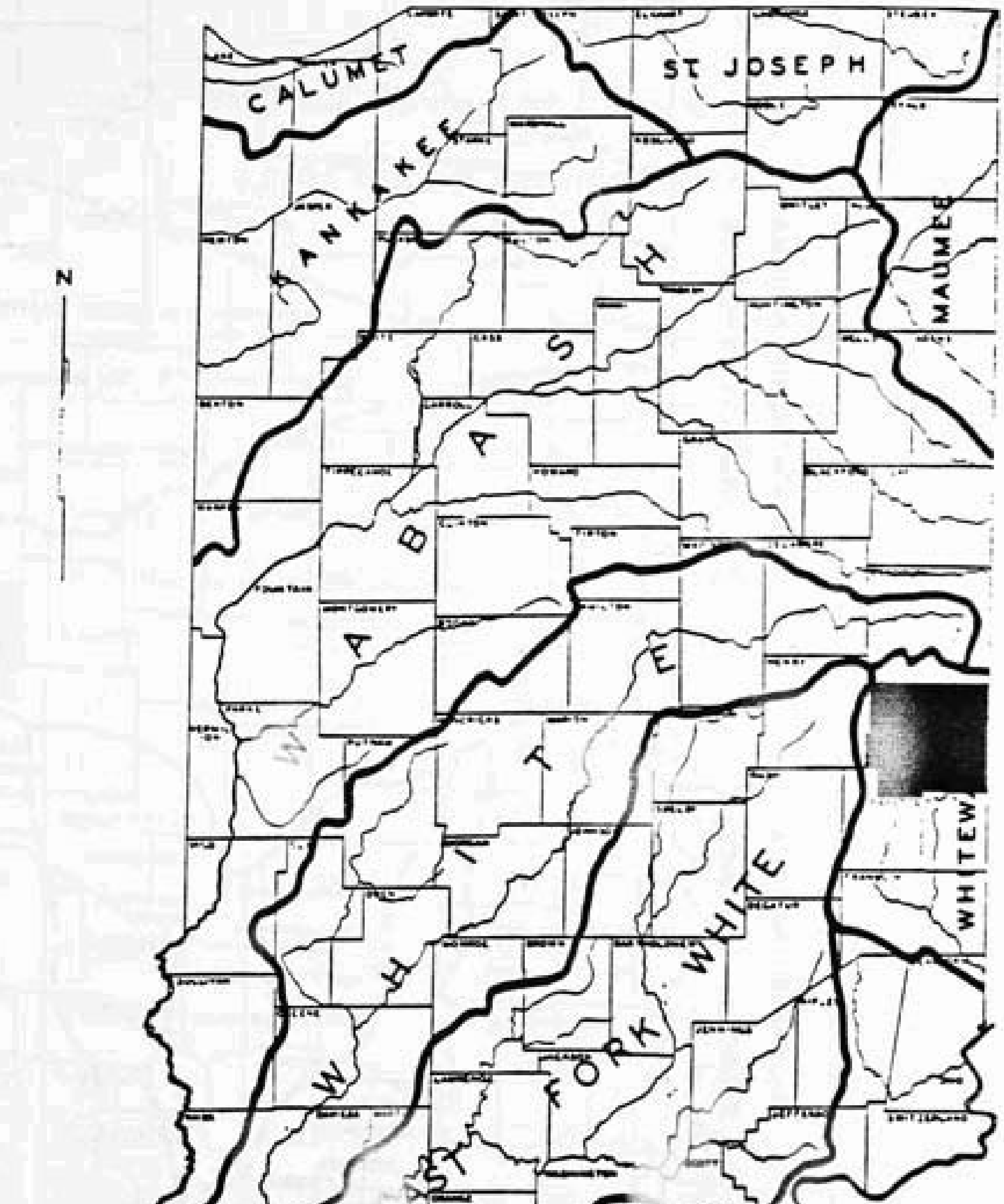


FIGURE 3. MAJOR WATERSHEDS OF INDIANA (6)

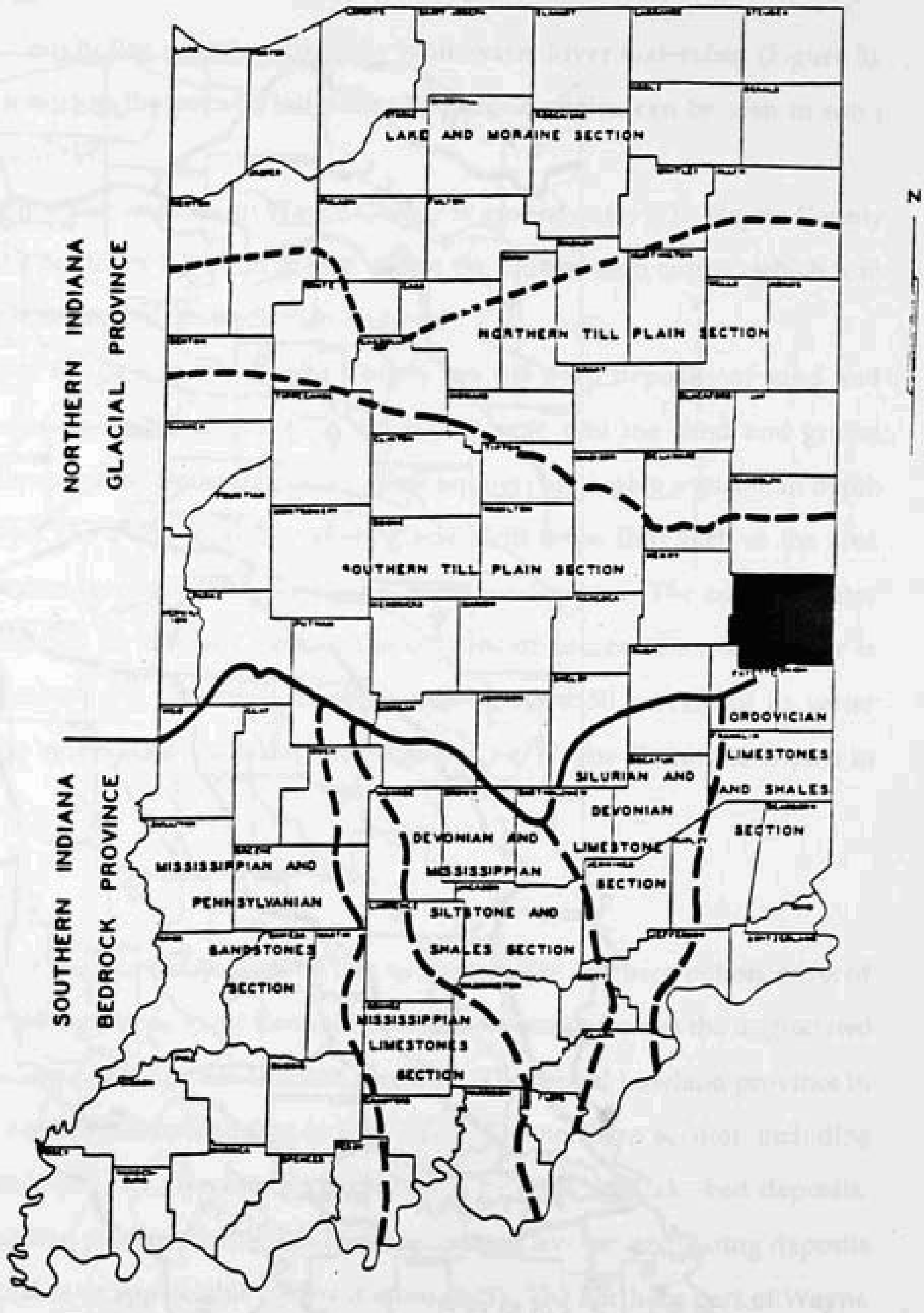


FIGURE 4. GROUNDWATER SECTIONS OF INDIANA (6)

Table 4. Water Use Summary for Wayne County (7)

(1989 usage in millions of gallons)

MONTH	SOURCE		
	Ground	Surface	Total
January	151.64	231.24	382.88
February	148.26	217.47	365.73
March	143.66	265.31	408.98
April	173.44	249.21	422.66
May	162.47	278.31	440.79
June	160.59	291.09	451.68
July	135.43	299.75	435.18
August	154.29	305.09	459.38
September	140.34	270.45	410.79
October	146.38	260.93	407.31
November	137.29	251.95	389.24
December	140.61	265.86	406.46
Total	1794.40	3186.68	4981.08

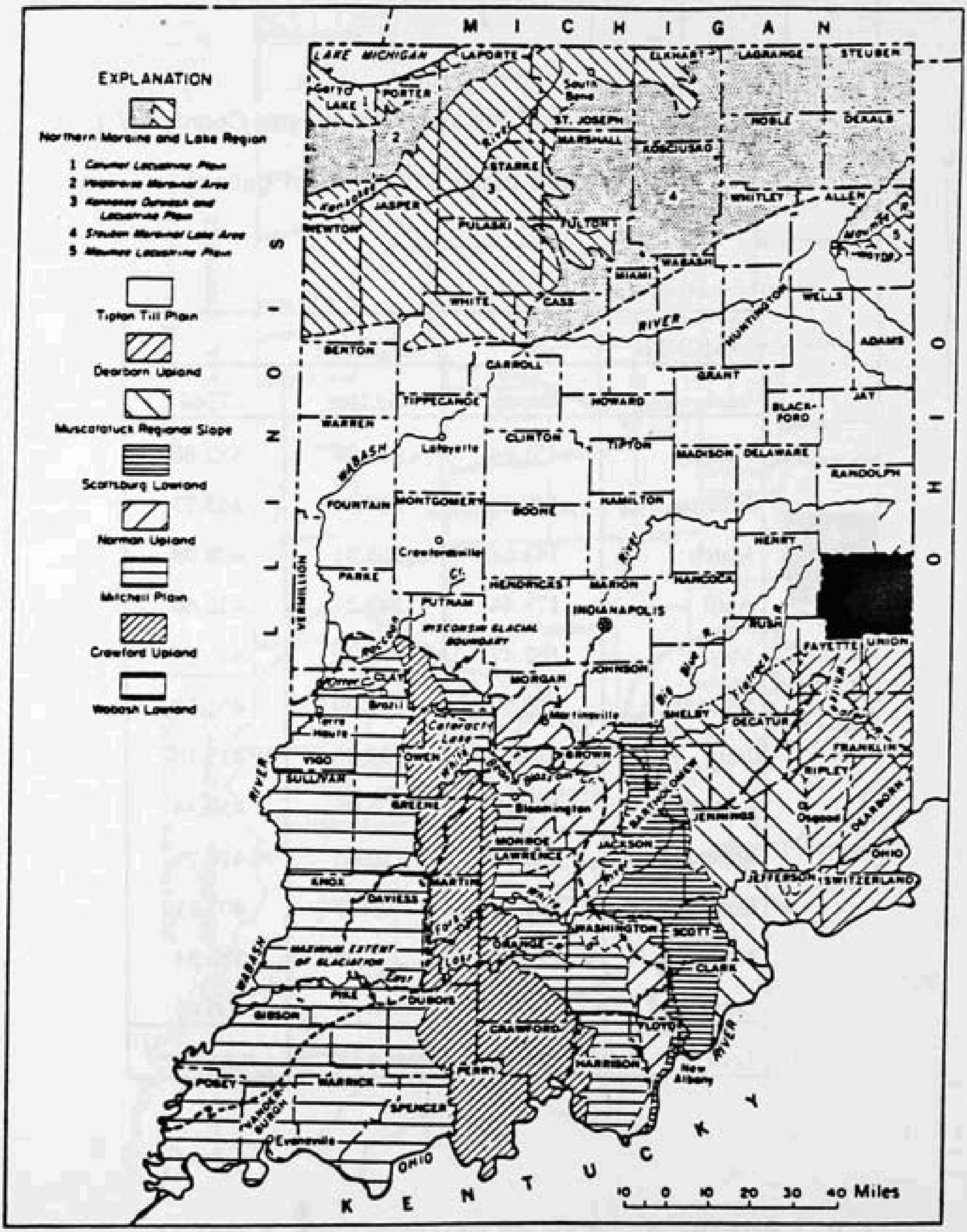


FIGURE 5. PHYSIOGRAPHIC UNITS AND GLACIAL BOUNDARIES IN INDIANA (9)

The Tipton Till Plain, extending across the central potion of the state from east to west, has more or less uniform topography compared with rugged and weathered southern Indiana. Since the region is monotonously flat, those rivers present are on low gradient. Only an occasional break in topography can be seen resulting from small moraines (8).

In contrast to Tipton Till Plain, the Dearborn Upland has semi-rugged terrain. Thus, highway construction is difficult due to the necessity of making deep cuts and high fills. The Dearborn Upland is also a dissected plain with shales as major bedrock material. Steep slopes are not unusual. Fluvial drift of glacial origin can be seen along the Whitewater River (8).

TOPOGRAPHY

The general topography of Wayne County is shown in Figure 6. The county has a variety of landforms. The East Fork of Whitewater River flows through a deep, narrow, rocky gorge at Richmond, whereas the stream valleys in the western part of the county are shallow (5). The land surface is dissected by the valleys of the two forks of the Whitewater River and their tributaries. The average altitude of the county is over 1000 feet. The highest altitude reaches 1257 feet above sea level, which is an area of Franklin Township about 1.5 miles northwest of Bethel. The lowest point is 800 feet above sea level. It is along the Whitewater River and Pottershop Road, in Abington Township (1). The maximum local relief is about 150 feet (5).

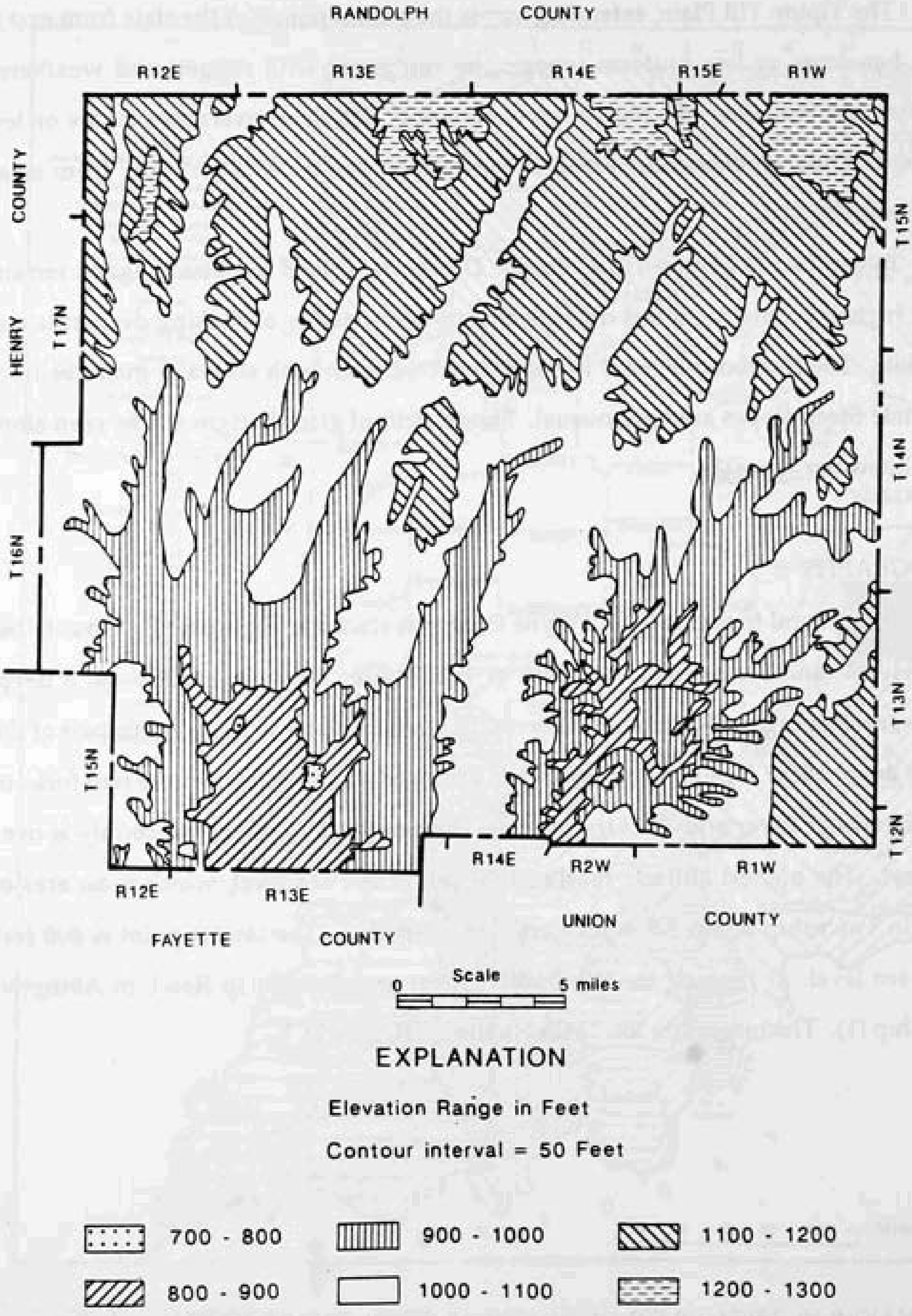


FIGURE 6 . TOPOGRAPHIC MAP OF WAYNE COUNTY (10)

GEOLOGY OF WAYNE COUNTY

Wayne County was completely glaciated and covered by glacial deposits left by the continental ice sheets. The bedrock is composed primary of dolomite, limestone, and shale, Ordovician to Silurian in age (Figure 7).

STRUCTURAL GEOLOGY

Wayne County lies on the crestal area of the Cincinnati Arch, which is a broad and platformlike anticline. This broad crestal feature, tending northwestward to Lake County from east-central Indiana, has breadths of a few scores of miles (12). The regional dip is low or indeterminate, whereas it is 35 feet or more per mile on the flanks of the arch (12). The Cincinnati Arch along with two adjacent large structural depressions, the Michigan Basin to the north and the Illinois Basin to the southwest, have a major influence on the outcrop pattern of Silurian formations (12-14).

GLACIAL GEOLOGY

All Wayne County was glaciated. The advance of ice covered Wayne County in the glacial age, and left a series of moraines behind as it retreated. The glacial deposits are Wisconsin in age. The present day thickness of these deposits ranges from a few feet to over 200 feet in the county. Wayne County is crossed by several morainic systems such as Bloomington Morainic System, Hartwell Morainic System, and Shelbyville Morainic System. They cover the northern and western parts of the county (15-17).

BEDROCK GEOLOGY

The bedrock in Wayne County is Ordovician in age except the northeastern and southeastern parts of the county, which consists of strata of Silurian age. Figure 8 is a map of bedrock geology of Indiana. The map of bedrock geology of Wayne County is

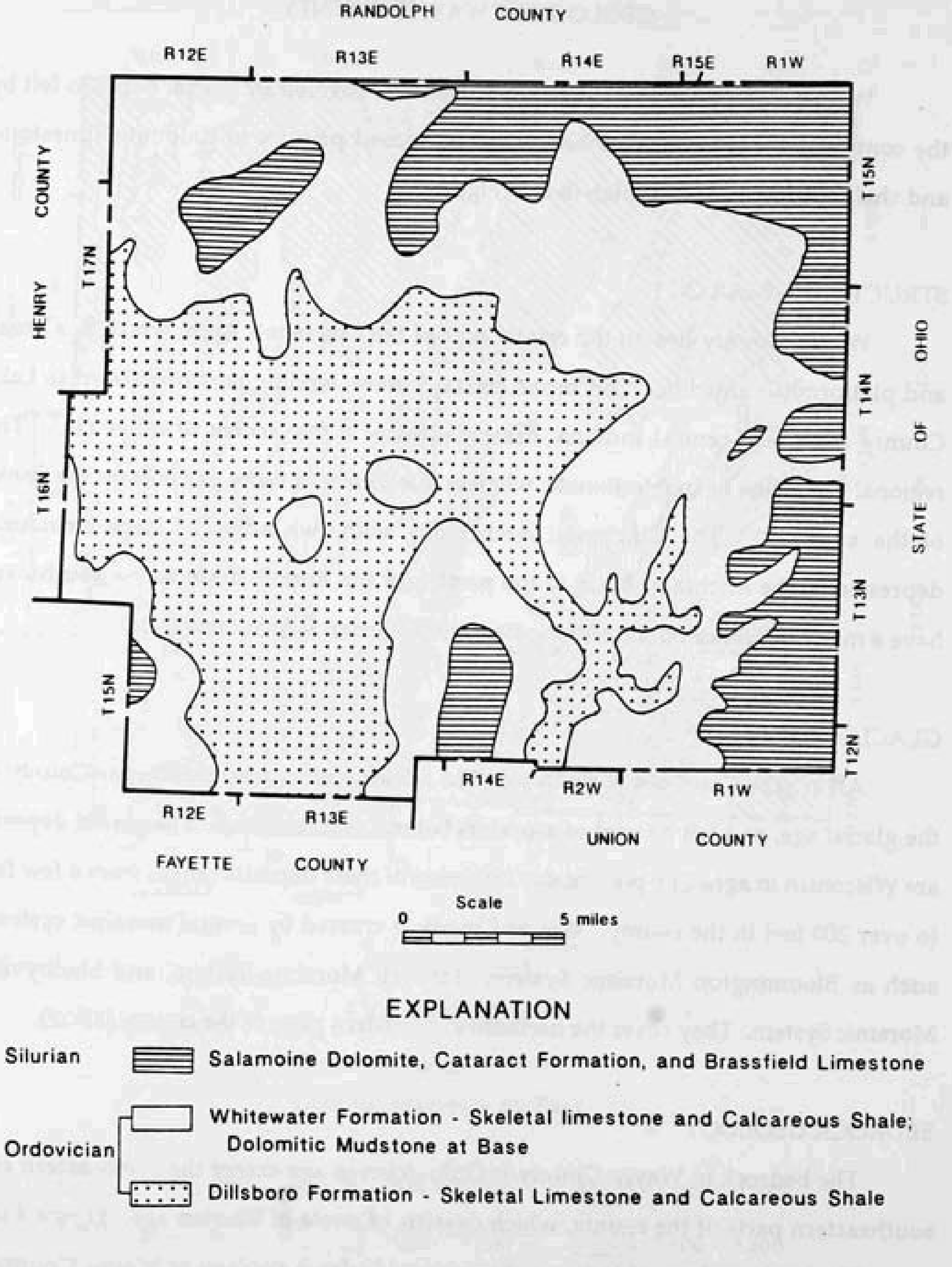


FIGURE 7 . BEDROCK GEOLOGY OF WAYNE COUNTY (11)

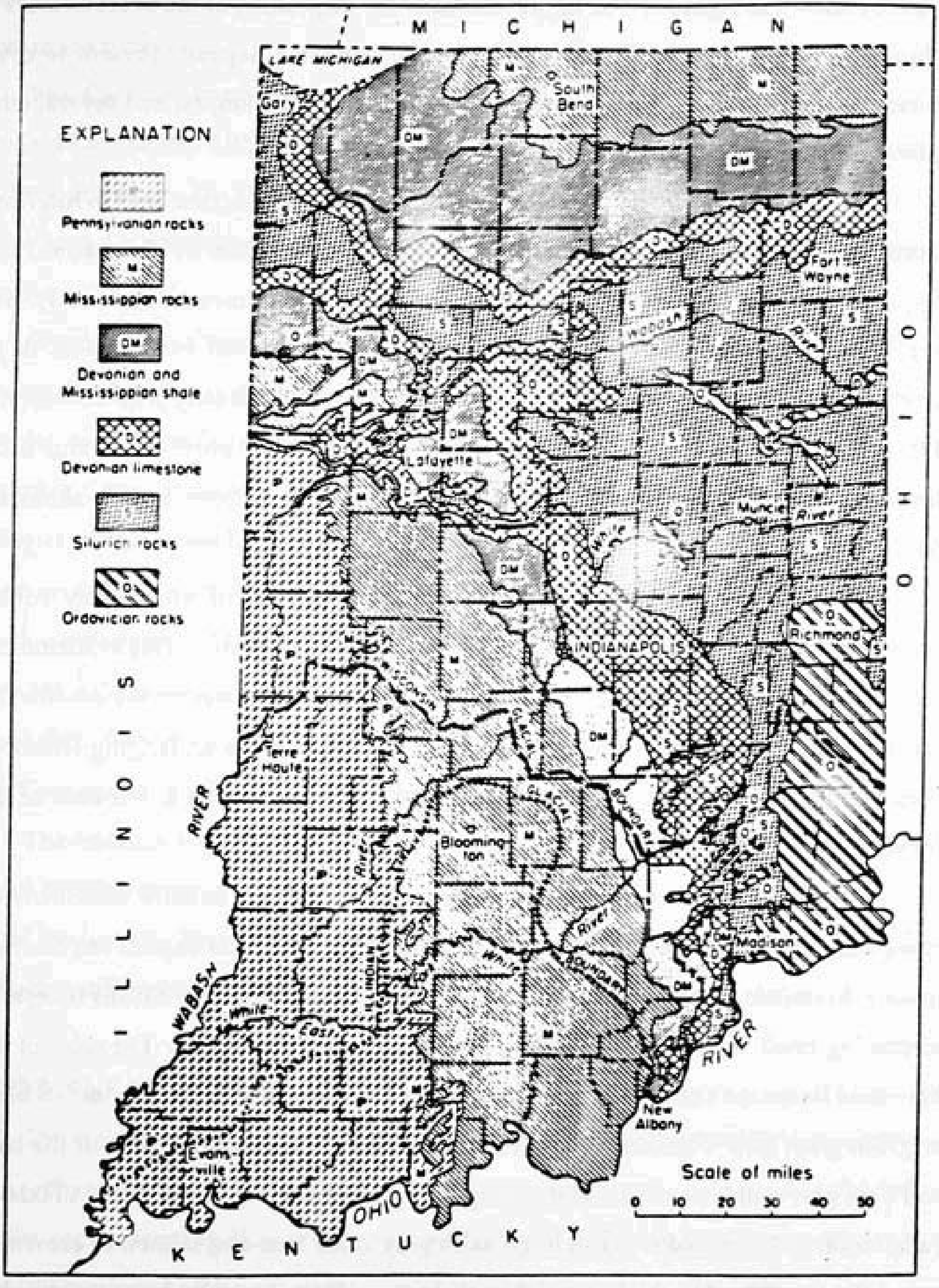


FIGURE 8. BEDROCK GEOLOGY OF INDIANA (18)

already shown in Figure 7. The figure illustrates the disposition of the bedrock units as they would appear today if there were no unconsolidated deposits present to cover them. Surface outcrops of limestone are encountered near Richmond and several other places in the southern part of the county.

The Ordovician rocks in Wayne County can be subdivided into Whitewater Formation and Dillsboro Formation. The lower rocks, Dillsboro Formation, is a sequence of highly fossiliferous argillaceous limestones and calcareous shales (19). The argillaceous limestones and calcareous shale are about equal in thickness in its designated type area, which is in southwestern Dearborn County and east-central Ripley County near Dillsboro. More shale is found to the northward, and more limestone to the southward (19). The overall thickness of the formation is about 400 feet, and it is overlain by the Whitewater Formation.

The Whitewater Formation was named for outcrops of bluish-gray rubbly limestone and interbedded calcareous shale along the Whitewater River at Richmond (19). The thickness is about 100 feet at Richmond, and decreases to the southward. Usually the formation has higher content of limestone than the underlying Dillsboro Formation (19). A unit of Dolomitic mudstone is now recognized at the base of the formation.

The boundary between Ordovician and Silurian rocks is usually difficult to be recognized although marked by an unconformity (12). Near the base of the Silurian rocks is Brassfield Limestone. It is a medium to coarse-grained fossiliferous limestone containing small amount of fine-grained dolomite in most places (19). The color of the Brassfield limestone varies from a pink, salmon colored brownish red, to a mottled blue, or green gray. (20). For example, near Richmond the color is nearly white at the base and dark gray with yellow grains at the top (19). Another example, the color at Elkhorn Falls, south of Richmond is bluish or greenish gray at the base and salmon or brownish red at the top (20). The thickness of Brassfield Formation is usually less than 4 feet at the exposures, but maximum thickness can achieve 14 feet along the outcrop belt, and 20 feet in the subsurface.

The Cataract Formation, recognized only in northeast Indiana, overlies the Brassfield Limestone. Lithologically, the Cataract Formation can be divided into three members. However, the three members can not be recognized south of Adams County (19). Where it is undivided, the Cataract Formation is generally a gray or tannish gray dolomite.

Overlying the Cataract Dolomite is Salamonie Dolomite. In northern Indiana, the Salamonie Dolomite has a vertical cutoff boundary with the upper part of the Cataract Dolomite, so that the lower Salamonie rocks in northwestern Indiana are equivalent to the upper Cataract rocks of northeastern Indiana (19). There are two principal lithologies of Salamonie Dolomite. The lower rocks consist of fine-grained argillaceous limestone dolomite, and dolomitic limestone, whereas the upper rocks consist of whitish coarser-grained bioclastic vuggy dolomite (19). Color is variable. In the areas where the Salamonie Dolomite is exposed at the bedrock surface, it is usually light-colored (12). One of the principal reference sections is located at the Meshberger Bros. Stone Corp. quarry near Ridgeville of Wayne County.

The bedrock topography of Wayne County is shown in Figure 9. The lowest bedrock altitude exists in the western part of the county, which corresponds to the West Fork of Whitewater River. The valley has been filled with Wisconsin glacial outwash and Recent stream alluvium.

PLEISTOCENE GEOLOGY

The Pleistocene sediments in Indiana are of continental origin rather than marine origin. Therefore, they are less homogeneous and continuous. The unconsolidated deposits encountered in Wayne County are illustrated in Figure 10. These sediments are of Wisconsinan and Recent stages.

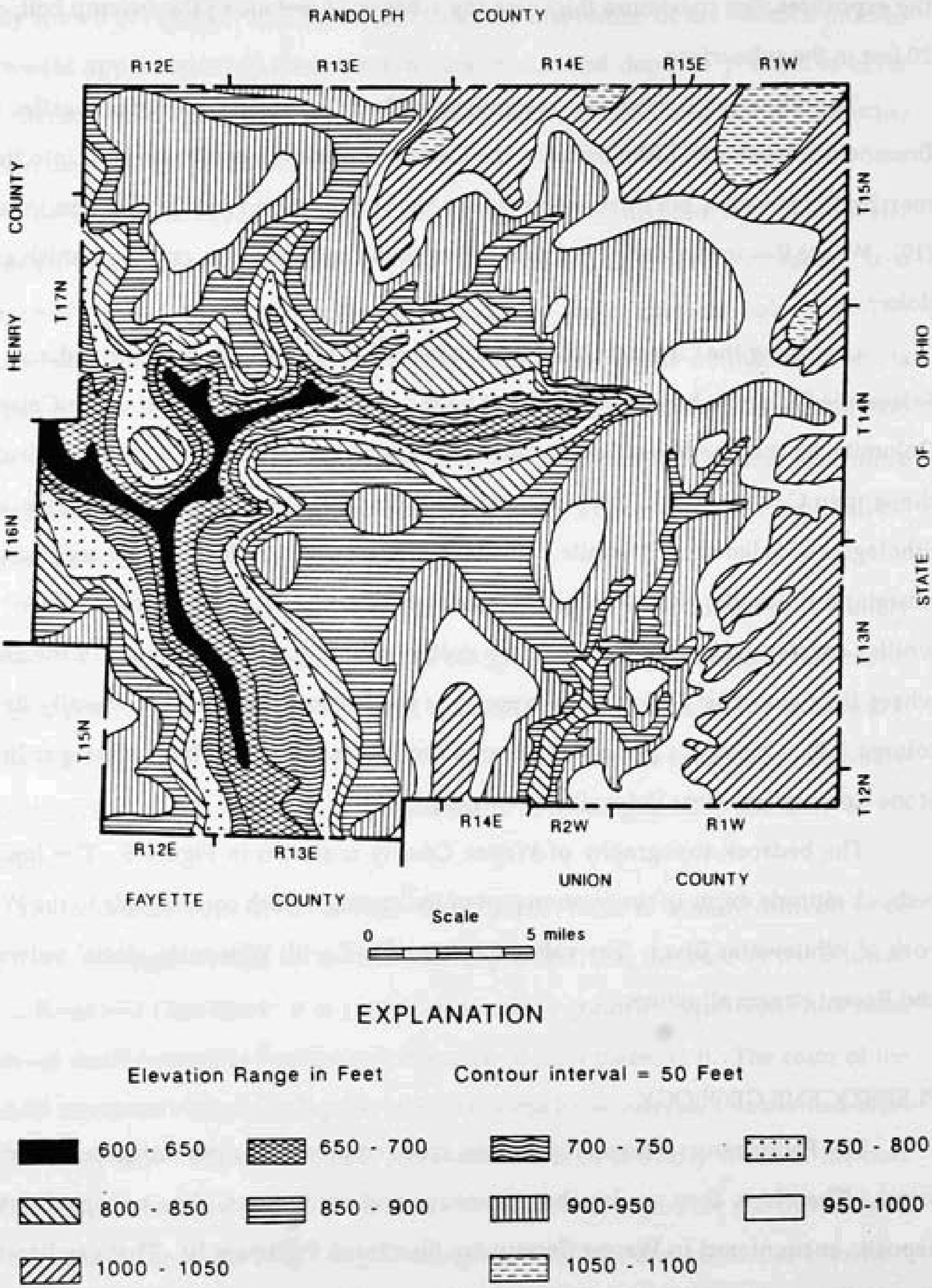


FIGURE 9. BEDROCK TOPOGRAPHY OF WAYNE COUNTY (21)

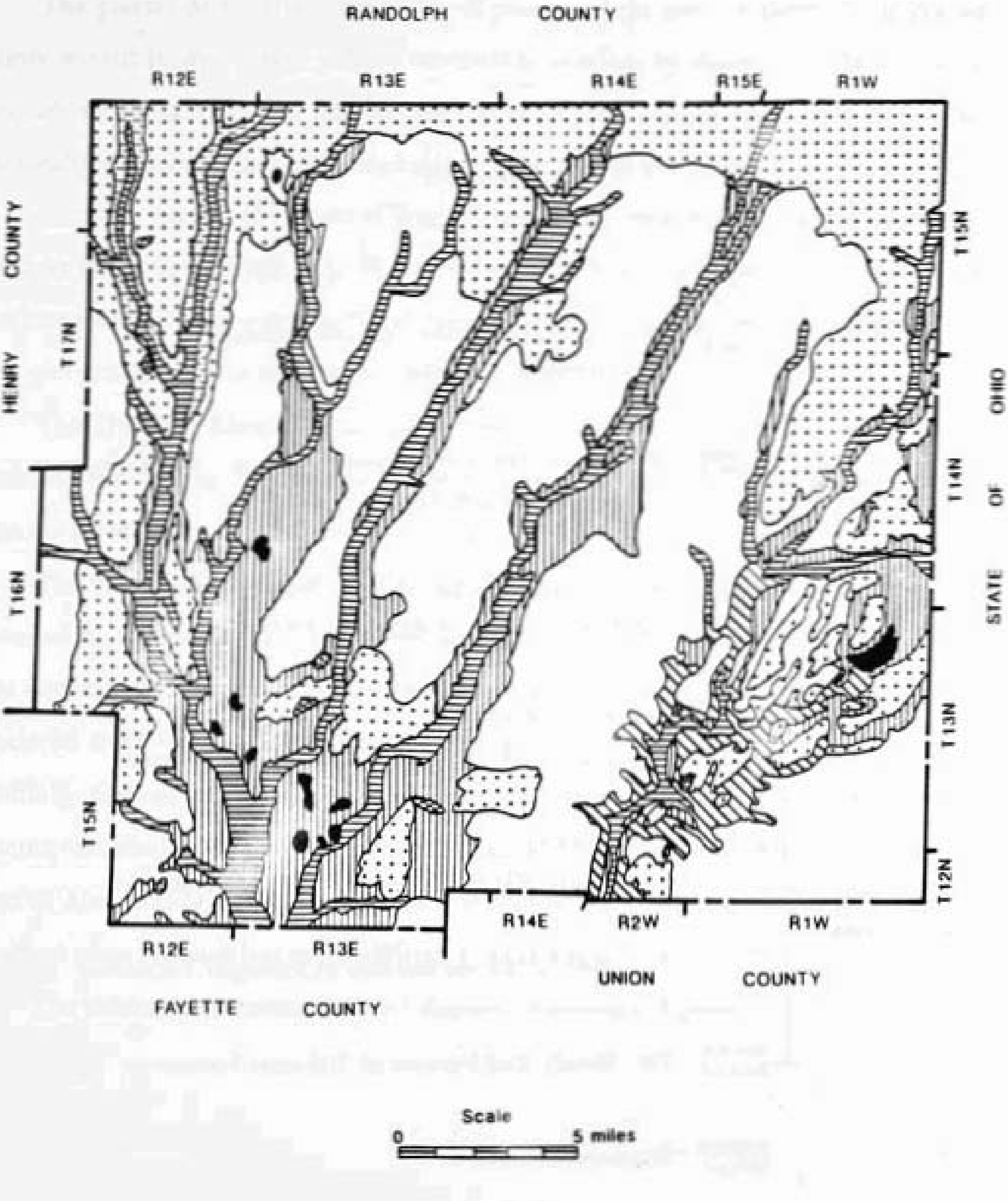


FIGURE 10. UNCONSOLIDATED DEPOSITS OF WAYNE COUNTY (22)

EXPLANATION

Recent	Silt, Sand and Gravel - Mostly Alluvium, Martinsville Formation
Recent and Wisconsinan	Muck, Peat and Marl - Paludal and Lacustrine Deposits, Martinsville Formation
Wisconsinan	Gravel, Sand and Silt Valley - Train Deposits; Outwash Facies of Atherton Formation
	Gravel, Sand and Silt, Outwash Plain Deposits of Atherton Formation
	Gravel, Sand and Silt, Kame and Esker Facies of Trafalgar Formation
	Till - Mainly Ground Moraine of Trafalgar Formation
	Till - Mainly End Moraine of Trafalgar Formation
	Exposed Bedrock

FIGURE 10. UNCONSOLIDATED DEPOSITS OF WAYNE COUNTY (22) (CONTINUED)

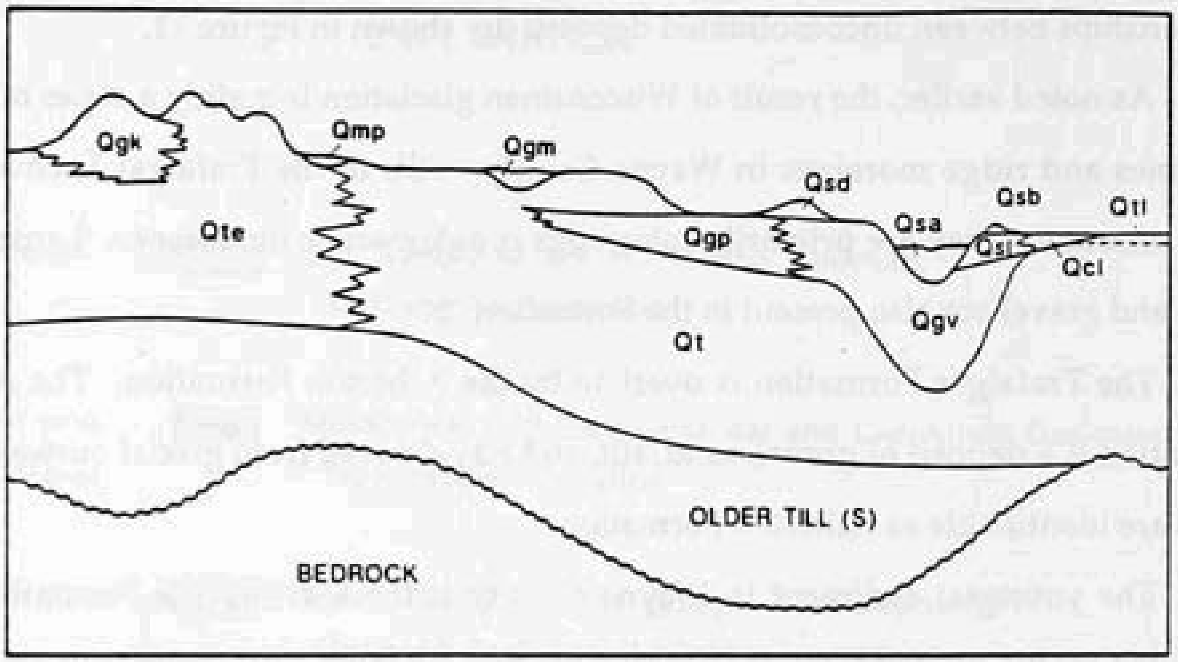
The glacial drift of Wisconsin age is present at the surface throughout Wayne County except in most river valleys where it is overlain by Recent alluvium. Those materials deposits by earlier glaciers are not distinguishable at the surface now. The relationships between unconsolidated deposits are shown in Figure 11.

As noted earlier, the result of Wisconsinan glaciation is mainly a series of ground moraines and ridge moraines in Wayne County. Tills of the Trafalgar Formation are most common. They are primarily calcareous conglomeratic mudstones. Lenses of silt, sand, and gravel are also present in the Formation (24).

The Trafalgar Formation is overlain by the Atherton Formation. The Atherton Formation is a deposit of gravel, sand, silt, and clay derived from glacial outwash. Four facies are identifiable as Atherton Formation.

The youngest sediment in Wayne County is the Martinsville Formation. It is deposited by the modern streams, small lakes and sloughs. Silt, sands, and gravels are most commonly found. The Martinsville Formation includes two facies. One is associated with flood plain deposition and referred as Alluvial facies, the other is essentially formed in still water and named Paludal facies (24). The Alluvial facies contains silt, sand, and gravel, and the Paludal is rich in organic matter. The Paludal facies is also highly fossiliferous. Peat in the Martinsville Formation, containing abundant plant remains but rare mollusks, exist in a few locations.

The thickness of unconsolidated deposits is shown in Figure 12.



EXPLANATION

Quaternary

Qsa	Silt, sand, and gravel
Qmp	Muck, peat, and marl
Qgm	Muck, clay, silt, and gravel
Qcl/Qsl	Clay, silt, and sand
Qsd/Qsb	Sand
Qgv/Qgp	Gravel, sand, and silt
Qgk	Gravel and sand
Qt/Qte	Till

FIGURE 11. SCHEMATIC SECTION SHOWING RELATIONSHIPS OF UNCONSOLIDATED DEPOSITS (23)

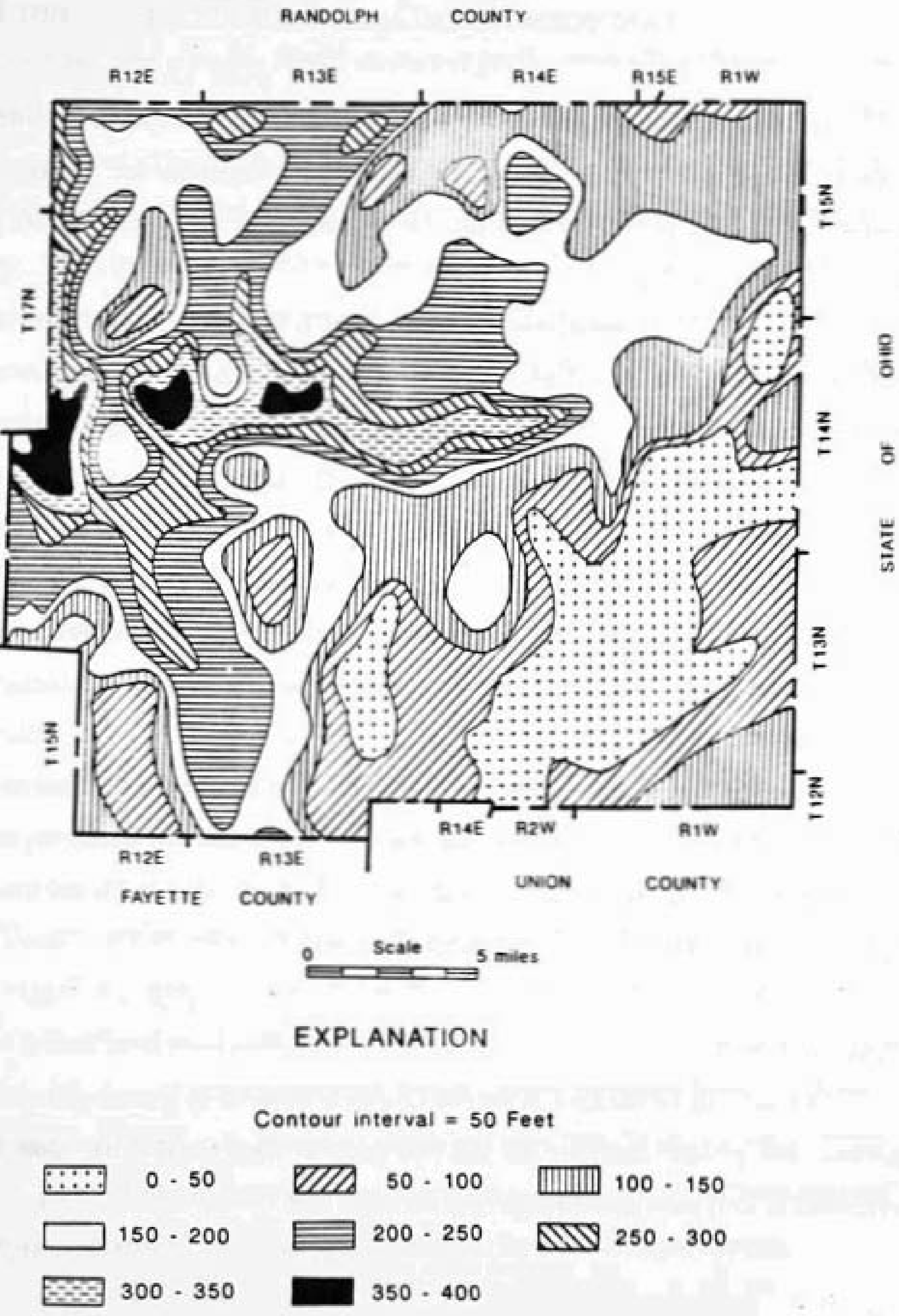


FIGURE 12. THICKNESS OF UNCONSOLIDATED DEPOSITS IN WAYNE COUNTY (23)

LANDFORM-PARENT MATERIAL REGIONS

The soils of Wayne County are primarily from unconsolidated sediments. These soils are mapped into four groups and associated subgroups for the engineering purpose. The four parent material units are glacial drift, glacial-fluvial drift, fluvial drift, and cumulose drift.

Each of the landform-parent material regions is characteristically identified by its surface texture, overall extent, and soil profiles. Available boring log data are collected in Appendix A. Classifications of the soils according to the American Association of State Highway and Transportation Officials (AASHTO) system are given along with the textures in terms of the designation adopted by the U.S. Department of Agriculture. In addition, the physical, chemical and engineering properties of the soils are summarized in Appendices B and C. Finally, Appendix E provides correlation charts and formulas for estimating soil properties based on their index parameters such as plasticity index and liquidity index.

The engineering considerations for each parent material unit are discussed here. For specific and detailed information, the reader should consult the boring reports listed in the references. This report only provides general information, and is not intended to replace site investigation for any engineering project.

GLACIAL DRIFT

The majority of the area in Wayne County is covered by glacial drift. The ridge moraine and ground moraine are the two parts of the glacial drift. Both of them composed of soils with broad range of grain sizes.

Ground Moraine

Ground moraine, a poorly sorted mixture of gravel, sand, silt, and clay, occupies the second largest portion of the county. These sediments are deposited by Wisconsinan glaciers. The surface is level to gentle rolling, sometimes broken by river courses or low knolls. Moraine is likely to be poorly drained because of relatively flat topography. Therefore, depressions where organic topsoils accumulated can be found on both ground moraine and ridge moraine (25-28). C-type gullies and V-type gullies can be found. The former is an indication of soils rich in clay or silty clay, whereas the latter is common in coarsed-grained soils such as sand and gravel.

The general soil profile in ground moraine usually consists of clay, clay loam, or sandy loam, underlain by subsurface soils of clay loam, sandy loam or sand. Among these soils, the thickness of clay, sandy loam, and clay loam may be as large as 9 feet.

Boring numbers 34-64, 292-312 are located in ground moraine.

Ridge Moraine

Ridge (end) moraine covers the largest area of Wayne County. Its texture is very similar to ground moraine, a poorly sorted mixture of gravel and sand in a silt and clay matrix, thus making it difficult to distinguish between ridge moraine and ground moraine. Usually, the boundary is defined by a topographic break, and ridge moraine has more rugged topography associated with it (13, 26). In addition, ridge moraine usually has greater local relief than ground moraine.

The distribution of ridge moraine in Wayne County coincides in part with local watershed divides, which is in northeast-southwest direction. It covers the northern and western parts of the county, and seems to be a merged portion of Bloomington Morainic System, Hartwell Morainic System, and Shelbyville Morainic System.

The general profile in ridge moraine features a surface layer of silt, clay loam, silty clay, and sandy clay loam, followed by subsoil of sandy loam, sandy clay, sandy clay loam, and sand and gravel.

Organic material is usually found in natural depressions in glacial drift. The profile common to areas of highly organic top soil consists of a surface layer of highly organic matter in loam ranging from 0 to 1.5 feet in thickness. The underlying soils are clay, clay loam, sandy clay loam.

Soil boring numbers 28-33, 66-70, 75-76, 91-108, 111-118, 121-128, 130-134, 136-142, 154-227, 240-255, 267-280, 314-322, 327-367, 371 are located in ridge moraine.

Engineering Considerations in Glacial Drift

The typical engineering properties of glacial drift are poor drainage, low permeability and susceptibility to frost action.

Frost action will cause the volume of the soil to expand 10% or more upon freezing. The expansion is usually not uniform, thus causing serious damage to highway pavements and structures. Moreover, during the spring thaw the water content in the soil is increased by the melted ice lenses. This will weaken the soil and create additional damage to the pavements (29).

To avoid frost action, the material under highway should be drained and granular, usually not more than 3 percent of the material be less than 0.02 mm in diameter. Utilities lines and building footings should be placed well below the frost line (30).

Another highway pavement problem is pavement pumping at pavement joints. Pumping is common to rigid pavements over ground moraine (27). Usually soil particles are carried out from beneath the pavement by the ejection of water due to traffic loading (8). Thus, cavities are formed underneath the pavements and cracking and faulting follow. Again, pumping is restricted to poorly drained areas. The damage can be reduced by replacing the fine-grained soils by drained granular ones.

The soils on glacial drift usually have high water contents. Therefore, it may be difficult to compact the soil to required levels. If too great a compaction energy is applied, the soil will actually become weaker. This is called overcompaction (29). It is recommended to remove all wet and soft surface soils before construction of the roadways, and backfill to an elevation above the groundwater table if groundwater is encountered.

The soils having high organic contents usually have very low strength and high compressibility. Elevated structures and highways are preferred, or all unstable soils should be removed and replaced by the soil with adequate engineering properties.

GLACIAL-FLUVIAL DRIFT

Outwash plain is the only recognized division of glacial-fluvial drift in Wayne County.

Outwash Plain

Outwash plains are broad plains formed by meltwater currents flowing from the glacier. The soils, consisting of silt, sand, and gravels, are highly stratified. The outwash plains are also affected by the erosion and deposition actions of modern streams because the streams sometimes flow in abandoned channel of outwash plain (13, 31).

The soils encountered in outwash plain are silty clay and clay loam, underlain by clay, sand and gravel.

Soil borings 65, 71-74, 77-90, 129, 135, 145-147, 149-153, 228-230, 236-239, 261-265, 281-289, 323, 325, 368-370 were made in outwash plains.

Engineering Considerations in Glacial-Fluvial Drift

The textures of outwash deposits are usually medium to coarse-grained, and segregated into distinct phases. In general, the outwash plain provides adequate support for light to moderately loaded buildings in the sandy phase (31). Also, it is a good potential source for construction materials such as sand and gravels.

The permeability of the soils are high. This should be taken into account when planning sanitary facilities and landfill sites.

FLUVIAL DRIFT

Fluvial drift appears in two landforms in Wayne County. They are flood plain and terrace. Both of them are associated with the stream valleys. Most of the gravels in Wayne County are found here (16).

Flood Plain

Flood Plains are distributed along Whitewater River and tributaries in Wayne County. All of them are narrow and restricted in aerial extent. Soils of flood plain generally are adjacent to the streams and in the low areas away from the streams.

The soil profile of flood plains varies from place to place. The soils in the profile include clay, loam, silt loam, silty clay, clay loam, sandy loam, silty clay loam, sand, and gravel.

Soil borings located in flood plain were numbers 1-27, 109-110, 119-120, 143-144, 148, 231-235, 256-260, 266, 290-291, 313, 324, 326.

Terrace

A few terraces are distributed along the stream valleys of the two major river systems. A typical profile has a surface layer of loam and clay loam, while the subsurface soils consists of sandy clay loam, sand and gravel. Three distinct levels of terraces are identified. The highest levels are usually weathered to a depth of 4 or 5 feet, the intermediate levels 3 to 4 feet, and the lowest levels 2 to 3 feet (16).

No soil borings were made in terrace.

Engineering Considerations in Fluvial Drift

Fluvial deposits are usually layered and highly variable (31). The permeability in the horizontal direction tends to be much greater then the vertical direction. Furthermore, the permeabilities in the surface layers are usually lower compared with the sublayers. Flooding, differential settlements and low shear strength are greatest concerns in the flood plain.

For terraces, high potential of erosion is the major engineering problems, especially on the side slopes. Circular types of slope failure are common after heavy rainfall.

The ground water table is close to the surface in fluvial drift. This makes excavation difficult. A dewatering scheme is recommended.

CUMULOSE DRIFT

Cumulose drift occurs in the form of muck basins in Wayne County.

Muck Basin

Muck basins are deposits associated with muck and highly organic matters. The sizes of muck basin are small and limited in number in Wayne County. The thickness of muck varies. However, muck layer as thick as 9 feet can be found. Muck basins are underlain by loam, silty clay, silt loam, clay, clay loam, and silty clay loam. Sand and gravel sometimes can be found at a depth greater than 3.4 feet.

No soil boring reports are available for muck basins at the time of preparing this report.

Engineering Considerations in Cumulose Drift

The characteristics of muck basin are high organic content, high water content, high porosity, high compressibility, low permeability, and low strength. Therefore, the muck basin is unsuited for roads or buildings. Usually, constructions on muck basin are avoided. However, if economically feasible, the soils in muck basin can be replaced by soils with adequate engineering properties.

MISCELLANEOUS

Gravel Pits

A number of gravel pits can be found in Wayne County. Some of them are active, and some of them are abandoned. Sand and gravel are mined from gravel pits. Each year a vast amount of sand and gravel is used in construction projects such as dams, highways, bridges, foundations, and buildings. Sand and gravel are classified according to their grain sizes. Loosely speaking, the coarse-grained soil with particle size greater than 2 mm are termed gravels, whereas sand is defined as soils with grain size less than 2mm.

Gravel pits are usually abandoned after the underlying sand and gravel are mined. However, sometimes the abandoned excavation sites are reclaimed for recreation purpose or housing development (32).

Marsh and Swamps

A few marshes are seen around the county and are shown on the Engineering Soil Map. The marsh and swamp soils are characterized by their low strength and high compressibility. Furthermore, they are generally corrosive (highly acidic) to foundation material (31).

SUMMARY OF ENGINEERING CONSIDERATIONS IN WAYNE COUNTY

Table 5 is the summary of engineering considerations for different landform-parent material regions in Wayne County. Each landform-parent material and its associated engineering problems are included in the table. However, the ranking shown in the table is recommended to be used as a general guideline only. Site specific investigation is always needed.

Sometimes a rough estimate of soil properties such as preconsolidation pressure and undrained shear strength is needed from available data in the preliminary stage of site investigation. These existing data are usually index parameters such as the liquid limits and plastic limits contained in Appendix A. Therefore, correlations between index parameters and engineering properties of soils are needed. There are many correlations existing in the literature, and some of them are summarized in Appendix E. These charts and formulas are intended to give engineers a feel about soil properties before performing more sophisticated soil tests. For more correlations such as those between in-situ tests and soil properties, reader can refer to reference 50.

Table 5. Summary of Engineering Considerations for Landform - Parent Material Regions in Wayne County

EXPLANATION

PROBABILITY OF A MAJOR PROBLEM DEVELOPING
L (LOW)
M (MEDIUM)
H (HIGH)

AVAILABILITY RATING
1 (LOW)
2 (MEDIUM)
3 (HIGH)

LANDFORM	GENERAL SOIL TEXTURE	CUT DESIGN					EMBANKMENT FILLS (COMPACTED PROPERTIES)					EMBANKMENT FOUNDATION				SUBGRADE				FOUNDATION DESIGN: SHALLOW FOOTINGS			FOUNDATION DESIGN: PILES				FOUNDATION DESIGN	MISCELLANEOUS				
		SOIL/ROCK BACKSLOPE INSTABILITY	GROUND WATER CONTROL	EROSION POTENTIAL	SURFACE DRAINAGE	NATURAL SLOPE AND RIVER BANK INSTABILITY	EROSION RESISTANCE	RELATIVE PERMEABILITY	INADEQUATE SHEAR STRENGTH	COMPRESSIBILITY WHEN SATURATED	WORKABILITY PROBLEMS	INADEQUATE SHEAR STRENGTH	EXCESSIVE SETTLEMENTS	ORGANIC DEPOSIT OCCURRENCE	GROUNDWATER CONTROL	SUBGRADE SUPPORT INADEQUATE	FROST ACTION POTENTIAL	PUMPING POTENTIAL	SHRINK SWELL POTENTIAL	INADEQUATE BEARING CAPACITY	EXCESSIVE SETTLEMENT POTENTIAL	SCOUR POTENTIAL	INADEQUATE BEARING CAPACITY	EXCESSIVE SETTLEMENT POTENTIAL	NEGATIVE SKIN FRICTION	SCOUR POTENTIAL	ESTIMATION OF LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES	AVAILABILITY OF AGGREGATE	[illegible]	[illegible] CORROSIVITY	[illegible] OF SEPTIC TANK FIELDS	GROUNDWATER RESOURCE POTENTIAL
ground moraine	sand, silt, clay	L	M/H	L/H	M/H	L	H	1	L/H	H	L/H	L	L	M/H	[illegible]	[illegible]	[illegible]	M/H	H	L	L	L	L	L	L/H	L/H	H	1	H	L	M	1
ridge moraine	sand, silt, clay	L	M/H	L/H	M/H	L	H	1	[illegible]	[illegible]	L/H	L	L	M/H	[illegible]	[illegible]	[illegible]	M/H	H	L	L	L	L	L	L/H	L/H	H	1	H	L	M	1
outwash plain	sand, gravel, silt	L	M/H	H	L	L	H	2-3	L	L	L	L	L	L	L	L	L/H	L	L	L	L	L	L	L	L	L	H	2-3	NA	L/H	M/H	2-3
flood plain	clay, silt, sand	M/H	M/H	M	L	M/H	L/H	3	L/H	H	L/H	L/M	M	H	M/H	L/H	M/H	H	L	H	M	M/H	L	L	L/H	M/H	NA	1	L/H	M	M/H	1-2
terrace	clay, silt, clay, grav.	M	M/H	M	L	M	L	2	M/H	H	L/H	H	H	H	M/H	H	M/H	L/H	M/H	H	H	M/H	L	L	L/H	M/H	NA	1-2	L/H	H	M/H	1
organic deposits	muck, marl	H	H	M	M	L	L	1	M	M	M	M	M	H	H	H	H	H	M	H	H	M	M/H	M	M/H	H	M	NA	M	H	M	1

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APPENDIX A

CLASSIFICATION TEST RESULTS FOR SELECTED ENGINEERING PROJECTS IN WAYNE COUNTY (33-48)

Appendix A1:
Borehole data for U.S. 35 in Wayne County

1.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
1	-	1	577+53	25RT	1047.6	0.0-1.5	Sand	-	3	-	-	-	-	-	-	-	-
		2	"	"	"	2.5-4.0	"	-	3	-	-	-	-	-	-	-	-
		3	"	"	"	5.0-6.5	"	-	7	-	-	-	-	-	-	-	-
		4	"	"	"	7.5-9.0	"	-	8	-	-	-	-	-	-	-	-
		5	"	"	"	10.0-11.5	"	-	8	-	-	-	-	-	-	-	-
		6	"	"	"	15.0-16.5	"	-	12	-	-	-	-	-	-	-	-
		7	"	"	"	20.0-21.5	"	-	9	-	-	-	-	-	-	-	-
		8	"	"	"	25.0-26.5	"	-	10	-	-	-	-	-	-	-	-
		9	"	"	"	30.0-31.5	"	-	13	-	-	-	-	-	-	-	-
		10A	"	"	"	35.0-36.0	"	-	16	-	-	-	-	-	-	-	-
		10B	"	[illegible]	"	36.0-36.5	Sandy Clay 10 am	-	-	-	-	-	-	-	-	-	-
		11	"	"	"	40.0-41.5	Sand	-	15	-	-	-	-	-	-	-	-
		12	"	"	"	45.0-46.5	"	-	[illegible]	[illegible]	-	-	-	-	-	-	-
		13	"	"	"	50.0-51.5	"	-	34	[illegible]	[illegible]	-	-	-	-	-	-

2.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
2		1	577+18	27LT	1048.6	0.0-1.5	Silty loam	-	5	-	-	-	-	-	-	-	-
		2	"	"	"	2.5-4.0	"	-	7	-	-	-	-	-	-	-	-
		3	"	"	"	5.0-6.5	Sand w/gravel	-	8	-	-	-	-	-	-	-	-
		4	"	"	"	7.5-9.0	"	-	11	-	-	-	-	-	-	-	-
		5	"	"	"	10.0-11.5	"	-	7	-	-	-	-	-	-	-	-
		6	"	"	"	15.0-16.5	"	-	19	-	-	-	-	-	-	-	-
		7	"	"	"	20.0-21.5	"	-	15	-	-	-	-	-	-	-	-
		8	"	"	"	25.0-26.5	"	-	16	-	-	-	-	-	-	-	-
		9	"	"	"	30.0-31.5	"	-	22	-	-	-	-	-	-	-	-

3.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
3		1	578+35	25LT	1046.0	0.0-1.5	Silty loam	-	3		-	-	-	-	-	-	-
		2A	"	"	"	2.5-3.5	"	-	3	-	-	-	-	-	-	-	-
		2B	"	"	"	3.5-4.0	Sand	-	-	-	-	-	-	-	-	-	-
		3	"	"	"	5.0-6.5	"	-	7	-	-	-	-	-	-	-	-
		4	"	"	"	7.5-9.0	Sandy loam	-	1	-	-	-	-	-	-	-	-
		5	"	"	"	10.0-11.5	Sand	-	7	-	-	-	-	-	-	-	-
		6	"	"	"	15.0-16.5	"	-	28	-	-	-	-	-	-	-	-
		7	"	"	"	20.0-21.5	"	-	20	-	-	-	-	-	-	-	-
		8A	"	"	"	25.0-25.5	"	-	20	-	-	-	-	-	-	-	-
		8B	"	"	"	25.5-26.5	Sandy clay loam	-	-	-	-	-	-	-	-	-	-
		9	"	"	"	30.0-31.5	Sand	-	12	-	-	-	-	-	-	-	-
		10	"	"	"	35.0-36.5	"	-	28	-	-	-	-	-	-	-	-
		11	"	"	"	40.0-41.5	"	-	19	-	-	-	-	-	-	-	-

4.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
4	-	1	578+69	27RT	1049.2	0.0-1.5	Sandy loam	-	12	-	-	-	-	-	-	-	-
		2	"	"	"	2.5-4.0	Silty loam	-	11	-	-	-	-	-	-	-	-
		3	"	"	"	5.0-6.5	Sand	-	10	-	-	-	-	-	-	-	-
		4	"	"	"	7.5-9.0	"	-	11	-	-	-	-	-	-	-	-
		5	"	"	"	10.0-11.5	"	-	16	-	-	-	-	-	-	-	-
		6	"	"	"	15.0-16.5	"	-	32	-	-	-	-	-	-	-	-
		7	"	"	"	20.0-21.5	"	-	19	-	-	-	-	-	-	-	-
		8	"	"	"	25.0-26.5	"	-	33	-	-	-	-	-	-	-	-
		9	"	"	"	30.0-31.5	"	-	38	-	-	-	-	-	-	-	-

Appendix A2:
Borehole data for U.S. 35 over Martindale Creek

1.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
5		1	691+50	33RT	1076.0	1.0-3.5	Silty clay	-	5	-	-	-	-	-	-	-	-
		2	"	"	"	3.5-6.0	Clay	-	7	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	Sandy gravel	-	9	-	-	-	-	-	-	-	-
		4	"	"	"	8.5-13.5	Clay	-	16	-	-	-	-	-	-	-	-
		5	"	"	"	13.5-18.5	Gravel	-	17	-	-	-	-	-	-	-	-
		6	"	"	"	18.5-23.5	Loam w/ gravel	-	32	-	-	-	-	-	-	-	-
		7	"	"	"	23.5-28.5	"	-	26	-	-	-	-	-	-	-	-
		8	"	"	"	28.5-29.4	"	-	>100	-	-	-	-	-	-	-	-
6		1	692+10	20LT	1071.0	1.0-3.5	Silty clay	-	8	-	-	-	-	-	-	-	-
		2	"	"	"	3.5-6.0	"	-	19	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	Clay	-	29	-	-	-	-	-	-	-	-
		4	"	"	"	8.5-13.5	"	-	18	-	-	-	-	-	-	-	-
		5	"	"	"	13.5-18.5	Sandy loam	-	17	-	-	-	-	-	-	-	-
		6	"	"	"	18.5-20.0	Loam & gravel	-	>100	-	-	-	-	-	-	-	-

2.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	ROD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
7		1	693+00	33RT	1078.0	1.0-3.5	Clay	-	8	-	-	-	-	-	-	-	-
		2	"	"	"	3.5-6.0	"	-	3	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	Loam w/ gravel	-	15	-	-	-	-	-	-	-	-
		4	"	"	"	8.5-13.5	Clay	-	8	-	-	-	-	-	-	-	-
		5	"	"	"	13.5-18.5	Sandy loam & gravel	-	22	-	-	-	-	-	-	-	-
		6	"	"	"	18.5-23.5	Loam w/ gravel	-	35	-	-	-	-	-	-	-	-
		7	"	"	"	23.5-28.5	"	-	41	-	-	-	-	-	-	-	-
		8	"	"	"	28.5-30.0	Loam	-	47	-	-	-	-	-	-	-	-

3.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	ROD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
8		1	692+60	33LT	1073.0	1.0-3.5	Clay	-	9	-	-	-	-	-	-	-	-
		2	"	"	"	3.5-6.0	Sandy gravel	-	10	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	Clay	-	19	-	-	-	-	-	-	-	-
		4	"	"	"	8.5-13.5	Clay w/ gravel	-	34	-	-	-	-	-	-	-	-
		5	"	"	"	13.5-18.5	Loam & gravel	-	[illegible]	[illegible]	-	-	-	-	-	-	-
		6	"	"	"	18.5-23.5	Silty clay loam	-	52	-	-	-	-	-	-	-	-
		7	"	"	"	23.5-28.5	Loam w/ clay	-	55	-	-	-	-	-	-	-	-
		8	"	"	"	28.5-33.5	Silty clay	-	68	-	-	-	-	-	-	-	-
		9	"	"	"	33.5-38.5	"	-	66	-	-	-	-	-	-	-	-
		10	"	"	"	38.5-43.5	"	-	74	-	-	-	-	-	-	-	-
		11	"	"	"	43.5--48.5	"	-	>100	-	-	-	-	-	-	-	-
		12	"	"	"	48.5-48.9	"	-	>100	-	-	-	-	-	-	-	-
9		1	687+00	27RT	1078.5	1.0-3.5	Clay loam	A-6(8)	8	-	1	27	48	24	32	19	13
		2	"	"	"	3.5-6.0	"	"	9	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	"	"	3	-	-	-	-	-	-	-	-
		4	"	"	"	8.5-10.0	Loam	-	13	-	-	-	-	-	-	-	-

4.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
10		1	690+00	35RT	1075.0	1.0-3.5	Silty clay	-	8	-	-	-	-	-	-	-	-
		2	"	"	"	3.5-6.0	Clay loam	-	6	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	"	-	12	-	-	-	-	-	-	-	-
		4	"	"	"	8.5-10.0	"	-	15	-	-	-	-	-	-	-	-
11		1	690+50	33RT	1076.0	1.0-3.5	Clay loam	-	6	-	-	-	-	-	-	-	-
		2	"	"	"	3.5-6.0	"	-	13	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	Loam	-	23	-	-	-	-	-	-	-	-
		4	"	"	"	8.5- 10.0	"	-	29	-	-	-	-	-	-	-	-
12		1	698+00	31RT	1083.5	1.0-3.5	Clay loam	-	6	-	-	-	-	-	-	-	-
		2	"	"	"	3.5-6.0	"	-	30	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	"	-	37	-	-	-	-	-	-	-	-
		4	"	"	"	8.5-10.0	Silty loam	-	31	-	-	-	-	-	-	-	-

Appendix A3:
Borehole data for U.S. 35 over Greens Fork Creek

1.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
13		1	1000+55	39LT	1051.0	1.0-3.5	Silty clay	-	16	-	-	-	-	-	-	-	-
		2	"	"	"	3.5-6.0	"	-	12	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	Loam w/ gravel	-	10	-	-	-	-	-	-	-	-
		4	"	"	"	8.5-13.5	"	-	15	-	-	-	-	-	-	-	-
		5	"	"	"	13.5-18.5	"	-	10	-	-	-	-	-	-	-	-
		6	"	"	"	18.5-23.5	Sandy loam w/gravel	-	13	-	-	-	-	-	-	-	-
		7	"	"	"	23.5-28.5	"	-	14	-	-	-	-	-	-	-	-
		8	"	"	"	28.5-30.0	"	-	21	-	-	-	-	-	-	-	-
14		1	1001+38	25RT	1049.0	1.0-3.5	Sandy loam	-	13	-	-	-	-	-	-	-	-
		2	"	"	"	3.5-6.0	"	-	4	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	"	-	18	-	-	-	-	-	-	-	-
		4	"	"	"	8.5-13.5	"	-	22	-	-	-	-	-	-	-	-
		5	"	"	"	13.5-18.5	Silty clay	-	23	-	-	-	-	-	-	-	-
		6	"	"	"	18.5-23.5	Sandy clay	-	25	-	-	-	-	-	-	-	-
		7	"	"	"	23.5-28.5	Sand	-	27	-	-	-	-	-	-	-	-
		8	"	"	"	28.5-30.0	"	-	20	-	-	-	-	-	-	-	-

2.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	ROD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
15		1	1002+18	26LT	1043.0	1.0-3.5	Loam w/ gravel	-	9	-	-	-	-	-	-	-	-
		2	"	"	"	3.5-6.0	Clay loam	-	6	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	Loam w/ gravel	-	26	-	-	-	-	-	-	-	-
		4	"	"	"	8.5-13.5	"	-	9	-	-	-	-	-	-	-	-
		5	"	"	"	13.5-18.5	"	-	25	-	-	-	-	-	-	-	-
		6	"	"	"	18.5-23.5	"	-	18	-	-	-	-	-	-	-	-
		7	"	"	"	23.5-28.5	Sandy loam & gravel	-	25	-	-	-	-	-	-	-	-
		8	"	"	"	28.5-33.5	"	-	21	-	-	-	-	-	-	-	-
		9	"	"	"	33.5-38.5	"	-	22	-	-	-	-	-	-	-	-
		10	"	"	"	38.5-43.5	"	-	30	-	-	-	-	-	-	-	-
		11	"	"	"	43.5-48.5	Sandy gravel	-	45	-	-	-	-	-	-	-	-
		12	"	"	"	48.5-50.0	Clay	-	<100	-	-	-	-	-	-	-	-

3.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
16	-	1	1002+91	25RT	1058.0	1.0-3.5	Silty loam	-	10	-	-	-	-	-	-	-	-
		2	"	"	"	3.5-6.0	Silty clay	-	9	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	Silty clay loam	-	13	-	-	-	-	-	-	-	-
		4	"	"	"	8.5-13.5	Sandy loam	-	10	-	-	-	-	-	-	-	-
		5	"	"	"	13.5-18.5	Sand	-	21	-	-	-	-	-	-	-	-
		6	"	"	"	18.5-23.5	"	-	32	-	-	-	-	-	-	-	-
		7	"	"	"	23.5-28.5	"	-	25	-	-	-	-	-	-	-	-
		8	"	"	"	28.5-30.0	Sandy loam	-	22	-	-	-	-	-	-	-	-
17		1	990+00	30LT	1053.0	1.0-3.5	Loam	A-6(5)	[illegible]		10	37	40	13	34	18	16
		2	"	"	"	3.5-6.0	"	"	14	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	Silty clay loam	-	16	-	-	-	-	-	-	-	-
		4	"	"	"	8.5-13.5	Clay loam	-	3	-	-	-	-	-	-	-	-
		5	"	"	"	13.5-15.0	Loam	-	18	-	-	-	-	-	-	-	-

4.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	ROD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
18		1	1005+00	35LT	1051.5	1.0-3.5	Loam	-	6	-	-	-	-	-	-	-	-
		2	"	"	"	3.5-6.0	Sandy gravel	-	24	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	"	-	23	-	-	-	-	-	-	-	-
		4	"	"	"	8.5-10.0	Sandy loam & gravel	-	41	-	-	-	-	-	-	-	-

Appendix A4

Borehole data for U.S. 35 over Nolands Fork Creek

1.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
19	-	1	1240+15	35LT	1045.0	1.0-3.5	Silty clay	-	9	-	-	-	-	-	-	-	-
		2	"	"	"	3.5-6.0	"	-	11	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	"	-	15	-	-	-	-	-	-	-	-
		4	"	"	"	8.5-13.5	"	-	21	-	-	-	-	-	-	-	-
		5	"	"	"	13.5-18.5	Loam w/ gravel	-	18	-	-	-	-	-	-	-	-
		6	"	"	"	18.5-23.5	"	-	24	-	-	-	-	-	-	-	-
		7	"	"	"	23.5-28.5	"	-	21	-	-	-	-	-	-	-	-
		8	"	"	"	28.5-30.0	"	-	16	-	-	-	-	-	-	-	-

2.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
20		1	1240+90	20RT	1038.0	1.0-3.5	Loam w/ gravel	-	7	-	-	-	-	-	-	-	-
		2	"	"	"	3.5-6.0	"	-	7	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	"	-	20	-	-	-	-	-	-	-	-
		4	"	"	"	8.5-13.5	"	-	13	-	-	-	-	-	-	-	-
		5	"	"	"	13.5-18.5	"	-	22	-	-	-	-	-	-	-	-
		6	"	"	"	18.5-23.5	"	-	17	-	-	-	-	-	-	-	-
		7	"	"	"	23.5-28.5	"	-	18	-	-	-	-	-	-	-	-
		8	"	"	"	28.5-33.5	"	-	28	-	-	-	-	-	-	-	-
		9	"	"	"	33.5-38.5	"	-	34	-	-	-	-	-	-	-	-
		10	"	"	"	38.5-43.5	"	-	24	-	-	-	-	-	-	-	-
		11	"	"	"	43.5-48.5	"	-	30	-	-	-	-	-	-	-	-
		12	"	"	"	48.5-50.0	"	-	45	-	-	-	-	-	-	-	-

3.

Boring No.	Project	Sample No.	Station No.	Offset	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	Soil Description AASHTO	Blow per Ft.	ROD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
21	-	1	1241+40	20LT	1043.0	1.0-3.5	Silty clay	-	10	-	-	-	-	-	-	-	-
		2	"	"	"	3.5-6.0	Clay loam	-	4	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	"	-	8	-	-	-	-	-	-	-	-
		4	"	"	"	8.5-13.5	Loam w/ gravel	-	17	-	-	-	-	-	-	-	-
		5	"	"	"	13.5-18.5	"	-	18	-	-	-	-	-	-	-	-
		6	"	"	"	18.5-23.5	"		17	-	-	-	-	-	-	-	-
		7	"	"	"	23.5-28.5	"	-	16	-	-	-	-	-	-	-	-
		8	"	"	"	28.5-30.0	"	-	31	-	-	-	-	-	-	-	-
22		1	1242+15	35RT	1046.0	1.0-3.5	Silty clay	-	16	-	-	-	-	-	-	-	-
		2	"	"	"	3.5-6.0	Clay loam	-	10	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	Loam w/ gravel	-	16	-	-	-	-	-	-	-	-
		4	"	"	"	8.5-13.5	"	-	21	-	-	-	-	-	-	-	-
		5	"	"	"	13.5-18.5	Loam	-	[illegible]	[illegible]	-	-	-	-	-	-	-
		6	"	"	"	18.5-23.5	"	-	[illegible]	[illegible]	-	-	-	-	-	-	-
		7	"	"	"	23.5-28.5	"	-	25	-	-	-	-	-	-	-	-
		8	"	"	"	28.5-30.0	Sandy loam w/gravel	-	47	-	-	-	-	-	-	-	-

4.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	Soil Description AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
23	-	1	1237+00	34LT	1044.5	1.0-3.5	Siltv clay loam	A-7-6(21)	12	-	3	14	58	25	47	23	24
		2	"	"	"	3.5-6.0	"	"	7	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	Loam	-	12	-	-	-	-	-	-	-	-
		4	"	"	"	8.5-10.0	"	-	18	-	-	-	-	-	-	-	-
24		1	1243+50	35LT	1045.0	1.0-3.5	Silty clay loam	-	11	-	-	-	-	-	-	-	-
		2	"	"	"	3.5-6.0	"	-	5	-	-	-	-	-	-	-	-
		3	"	"	"	6.0-8.5	Loam	-	32	-	-	-	-	-	-	-	-
		4	"	"	"	8.5-10.0	"	-	26	-	-	-	-	-	-	-	-
25			1247+00	55RT	1041.5	0.0-2.5	Silty clay	-	-	-	-	-	-	-	-	-	-
			"	"	"	2.5-3.0	Clay loam	-	-	-	-	-	-	-	-	-	-
26			1246+00	55RT	1041.0	0.0-1.5	Silty clay	-	-	-	-	-	-	-	-	-	-
			"	"	"	1.5-2.0	Silty clay loam	-	-	-	-	-	-	-	-	-	-

5.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
27	-		1245+00	55RT	1041.0	1.0-2.0	Silty clay	-			-	-	-	-	-	-	-
			"	"	"	2.0-2.5	Silty clay loam	-	-	-	-	-	-	-	-	-	-

Appendix A5:
Borehole data for S.R. 227 over Brook Creek

1.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
28		SS-1	100+63	36.5RT	1079.9	0.5-2.0	Gravel	-	7	-	-	-	-	-	-	-	-
		SS-2	"	"	"	3.6-4.0	Sandy silty loam	-	34	-	11	41	40	8	21	13	8
		SS-3	"	"	"	5.0-6.5	"	A-4(1)	65	-	-	-	-	-	-	-	-
		SS-4	"	"	"	7.5-9.0	Sand & gravel	-	40	-	-	-	-	-	-	-	-
		SS-5	"	"	"	10/0-11.5	"		>100	-	-	-	-	-	-	-	-
		SS-6	"	"	"	12.0-12.5	Limestone	-	-	-	-	-	-	-	-	-	-
		RUN-1	"	"	"	12.5-14.5	"	-	-	0	-	-	-	-	-	-	-
		RUN-2	"	"	"	14.5-19.5	"	-	-	17	-	-	-	-	-	-	-
		RUN-3	"	"	"	19.5-22.5	"	-	-	20	-	-	-	-	-	-	-
29		SS-1	100+79	23LT	1081.0	0.5-2.0	Silt	-	4	-	-	-	-	-	-	-	-
		SS-2	"	"	"	3.0-4.5	Sand & gravel	-	12	-	-	-	-	-	-	-	-
		SS-3	"	"	"	5.0-6.5	Sandy silty loam	-	31	-	-	-	-	-	-	-	-
		SS-4	"	"	"	7.5-9.0	"	-	71	-	-	-	-	-	-	-	-
		SS-5	"	"	"	10.0-11.5	"	-	>100	-	-	-	-	-	-	-	-
		RUN-1	"	"	"	13.0-18.0	Limestone	-	-	27	-	-	-	-	-	-	-

2.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
30		SS-1	102+12	23LT	1098.0	0.5-2.0	Sandy silty loam	A-4(1)	8	-	-	-	-	-	-		-
		SS-2	"	"	"	2.5-4.0	"	"	17	-	8	33	46	13	20	14	6
		SS-3	"	"	"	5.0-6.5	"	"	14	-	14	32	38	16	20	13	7
		SS-4	"	"	"	7.5-9.0	"	"	19		-	-	-	-	-	-	-
		SS-5	"	"	"	100-11.5	"	"	19	-	-	-	-	-	-	-	-
		BS	"	"	"	2.0-3.5	Silty [illegible]	"	-	-	17	32	44	7	21	13	8

Appendix Ab:
Borehole data for S.R. 27 at maintenance section C2

1.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	Soil Description AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Grain Size Distribution Sand	Grain Size Distribution Silt	Grain Size Distribution Clay	LL	PL	PI
31		-	7+00	12RT	-	1.0-2.0	Silty clay loam	A-4	-	-	1	20	52	23	34	23	11
		-	"	"	-	2.0-5.0	Clay loam	A-7-6	-	-	2	23	48	18	42	20	22
		-	"	"	-	5.0-6.0	Sandy clay loam or clay loam	A-4	-	-	8	41	27	17	21	14	7
32		-	10+50	12RT	-	1.0-5.5	Silty loam	A-4	-	-	0	25	67	5	17	17	0
33		-	10+25	12RT	-	1.5-6.0	Sand	A-3	-	-	4	87	6	2	20	NP	NP

Appendix A7:
Borehole data for I-70 at Centerville Rest Area

1.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
34	·	SS-1	4+40	CL	1097.32	1.0-2.5	Clay loam	A-4	33	-	-			-	-	-	-
		SS-2	"	"	"	3.5-5.0	"	"	36	-	-	-	-	-	-	-	-
		SS-3	"	"	"	6.0-7.5	"	"	17	-	-	-	-	-	-	-	-
35		SS-1	6+80	CL	1095.59	1.0-2.5	Clay loam	A-4(2)	33	-	-	-	-	-	-	-	-
		SS-2	"	"	"	3.5-5.0	"	"	[illegible]		-	-	-	-	-	-	-
		SS-3	"	"	"	6.0-7.5	"	"	16	-	-	-	-	-	-	-	-
		Bag	"	"	"	0.5-1.5	"	"	-	-	3	31	46	13	26	29	7
36		SS-1	9+85	CL	1094.78	1.0-2.5	Silt loam	A-4	25	-	-	-	-	-	-	-	-
		SS-2	"	"	"	3.5-5.0	"	"	42	-	-	-	-	-	-	-	-
		SS-3	"	"	"	6.0-7.5	"	"	38	-	-	-	-	-	-	-	-
37		SS-1	14+00	CL	1091.56	1.0-2.5	Clay loam	A-4	24	-	-	-	-	-	-	-	-
		SS-2	"	"	"	3.5-5.0	"	"	14	-	-	-	-	-	-	-	-
		SS-3	"	"	"	6.0-7.5	"	"	45	-	-	-	-	-	-	-	-

2.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	ROD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
38	-	SS-1	17+45	CL	1090.26	1.0-2.5	Sandy loam	A-4	58	-	-	-	-	-	-	-	-
		SS-2	"	"	"	3.5-5.0	"	"	25	-	-	-	-	-	-	-	-
		SS-3	"	"	"	6.0-7.5	Clay loam	"	24	-	-	-	-	-	-	-	-
39		SS-1	4+50	CL	1089.53	1.0-2.5	Clay loam	A-4	24	-	-	-	-	-	-	-	-
		SS-2	"	"	"	3.5-5.0	"	"	26	-	-	-	-	-	-	-	-
		SS-3	"	"	"	6.0-7.5	"	"	17	-	-	-	-	-	-	-	-
		SS-4	"	"	"	8.5-10.0	"	"	47	-	-	-	-	-	-	-	-
		SS-5	"	"	"	11.0-12.5	"	"	27	-	-	-	-	-	-	-	-
40		SS-1	6+70	CL	1086.41	1.0-2.5	Clay loam	A-4	13	-	-	-	-	-	-	-	-
		SS-2	"	"	"	3.5-5.0	Sand	-	12	-	-	-	-	-	-	-	-
		SS-3	"	"	"	6.0-7.5	Clay loam	A-4	24	-	-	-	-	-	-	-	-
		SS-4	"	"	"	8.5-10.0	"	"	41	-	-	-	-	-	-	-	-

3.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
41	-	SS-1	12+50	CL	1091.43	1.0-2.5	Clay loam	A-4	11	-	-	-	-	-	-	-	-
		SS-2	"	"	"	3.5-5.0	"	"	24	-	-	-	-	-	-	-	-
		SS-3	"	"	"	6.0-7.5	"	"	22	-	-	-	-	-	-	-	-
		SS-4	"	"	"	8.5-10.0	"	"	26	-	-	-	-	-	-	-	-
42		SS-1	17+00	CL	1095.15	1.0-2.5	Clay loam	A-4	16	-	-	-	-	-	-	-	-
		SS-2	"	"	"	3.5-5.0	"	"	32	-	-	-	-	-	-	-	-
		SS-3	"	"	"	6.0-7.5	"	"	44	-	-	-	-	-	-	-	-
43		SS-1	516-15	312RT	1093.64	1.0-2.5	Clay	A-6	14	-	-	-	-	-	-	-	-
		SS-2	"	"	"	3.5-5.0	"	"	17	-	-	-	-		-	-	-
		SS-3	"	"	"	6.0-7.5	"	"	14	-	-	-	-	-	-	-	-
		SS-4	"	"	"	8.5-10.0	"	"	34	-	-	-	-	-	-	-	-

4.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
44		SS-1	516+00	350RT	1094.78	1.0-2.5	Clay	A-6	16	-	-	-	-	-	58	23	35
		SS-2	"	"	"	3.5-5.0	"	"	17	-	-	-	-	-	-	-	-
		SS-3	"	"	"	6.0-7.5	"	"	14	-	-	-	-	-	-	-	-
		SS-4	"	"	"	8.5-10.0	"	"	14	-	-	-	-	-	-	-	-
		SS-5	"	"	"	11.0-12.5	"	"	19	-	-	-	-	-	-	-	-
		SS-6	"	"	"	13.5-15.0	"	"	31	-	-	-	-	-	-	-	-
45		SS-1	516-38	330RT	1093.25	1.0-2.5	Clay	A-6(15)	14	-	4	21	37	12	39	17	22
		SS-2	"	"	"	3.5-5.0	"	"	8	-	4	21	37	12	39	17	22
		SS-3	"	"	"	6.0-7.5	"	"	10	-	-	-	-	-	-	-	-
		SS-4	"	"	"	8.5-10.0	"	"	18	-	-	-	-	-	-	-	-

5.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	ROD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
46	-	SS-1	519+25	305RT	1092.39	1.0-2.5	Clay loam	A-4	20	-	-	-	-	-	-	-	-
		SS-2	"	"	"	3.5-5.0	"	"	24	-	-	-	-	-	-	-	-
		SS-3	"	"	"	6.0-7.5	"	"	11	-	-	-	-	-	-	-	-
		SS-4	"	"	"	8.5-10.0	"	"	25	-	-	-	-	-	-	-	-
		SS-5	"	"	"	11.0-12.5	"	"	33	-	-	-	-	-	-	-	-
		SS-6	"	"	"	13.5-15.0	"	"	48	-	-	-	-	-	-	-	-
47		SS-1	519+55	280RT	1091.94	1.0-2.5	Clay loam	A-4	12	-	-	-	-	-	-	-	-
		SS-2	"	"	"	3.5-5.0	"	"	20	-	-	-	-	-	-	-	-
		SS-3	"	"	"	6.0-7.5	"	"	[illegible]	[illegible]	[illegible]	-	-	-	-	-	-
		SS-4	"	"	"	8.5-10.0	Sandy loam	A-4(0)	11	[illegible]	15	37	35	8	19	14	5
		SS-5	"	"	"	11.0-12.5	"	"	33	-	15	37	35	8	19	14	5
		SS-6	"	"	"	13.5-15.0	Clay loam	A-4	21	-	-	-	-	-	-	-	-

6.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
48		SS-1	516+17	295LT	1092.59	1.0-2.5	Clay loam	A-4	22	-	-	-	-	-	-	-	-
		SS-2	"	"	"	3.5-4.9	"	"	>100	-	-	-	-	-	-	-	-
		SS-3	"	"	"	6.0-7.5	"	"	32	-	-	-	-	-	-	-	-
		SS-4	"	"	"	8.5-10.0	"	"	36	-	-	-	-	-	-	-	-
49		SS-1	516+17	316LT	1091.33	1.0-2.5	Clay loam	A-4	16	-	-	-	-	-	-	-	-
		SS-2	"	"	"	3.5-5.0	"	"	44	-	-	-	-	-	-	-	-
		SS-3	"	"	"	6.0-7.5	"	"	35	-	-	-	-	-	-	-	-
		SS-4	"	"	"	8.5-10.0	"	"	43	-	-	-	-	-	-	-	-

Appendix A8:
Borehole data for westbound & eastbound weigh station modernization on I-70

1.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							T[illegible]	AASHTO			Gravel	Sand	Silt	Clay			
50		SS-1	213+00	25RT	1016.3	0.0-1.5	Topsoil	-	12	-	-	-	-	-	-	-	-
		SS-2	"	"	"	1.5-3.0	Clay loam	A-7-6	8	-	-	-	-	-	-	-	-
		SS-3	"	"	"	3.5-5.0	Sandy loam	A-1-6	14	-	-	-	-	-	-	-	-
		SS-4	"	"	"	6.0-7.5	"	A-4	14	-	-	-	-	-	-	-	-
51		SS-1	223+00	14RT	1026.0	0.0-1.5	Clay	A-7-6	7	-	-	-	-	-	-	-	-
		SS-2	"	"	"	1.5-3.0	Clay loam	"	10	-	-	-	-	-	-	-	-
		SS-3	"	"	"	3.5-5.0	Sandy loam	A-4	34	-	-	-	-	-	-	-	-
		SS-4	"	"	"	6.0-7.5	"	"	22	-	-	-	-	-	-	-	-
52		SS-1	239-50	[illegible]RT	1040.6	0.0-1.5	Sandy loam	A-4	8	-	-	-	-	-	-	-	-
		SS-2	"	"	"	1.5-3.0	"	"	14	-	-	-	-	-	-	-	-
		SS-3	"	"	"	3.5-5.0	"	"	35	-	-	-	-	-	-	-	-
		SS-4	"	"	"	6.0-7.5	"	"	31	-	-	-	-	-	-	-	-

2.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
53		SS-1	240+00	150RT	1045.2	0.0-1.5	Clay loam	A-7-6(10)	20	-	-	-	-	-	-	-	-
		SS-2	"	"	"	1.5-3.0	"	"	14	-	17	27	29	26	43	18	25
		SS-3	"	"	"	3.5-5.0	Sandy loam	A-4	7	-	-	-	-	-	-	-	-
		SS-4	"	"	"	6.0-7.5	"	"	23	-	-	-	-	-	-	-	-
54		SS-1	241+55	100RT	1045.1	1.5-3.0	Clay loam	A-7-6	13	-	-	-	-	-	-	-	-
		S'	"	"	"	3.5-5.0	"	"	5	-	-	-	-	-	-	-	-
		SS-3	"	"	"	6.0-7.5	Sandy loam	A-4	7	-	-	-	-	-	-	-	-
		SS-4	"	"	"	8.5-10.0	"	"	14	-	-	-	-	-	-	-	-
		SS-5	"	"	"	13.5-15.0	"	"	29	-	-	-	-	-	-	-	-
55		SS-1	244+44	200RT	1042.5	0.0-1.5	Topsoil	-	10	-	-	-	-	-	-	-	-
		SS-2	"	"	"	1.5-3.0	Clay	A-7-6(23)	7	-	-	-	-	-	-	-	-
		SS-3	"	"	"	3.5-5.0	Sandy loam	A-4	11	-	-	-	-	-	-	-	-
		SS-4	"	"	"	6.0-7.5	"	"	34	-	-	-	-	-	-	-	-
		BS-1	"	"	"	1.0-3.0	Clay	A-7-6(23)	-	-	1	23	39	37	50	20	30

3.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
56	-	SS-1	245+00	23RT	1045.6	0.0-1.5	Fill	-	28	-	-	-	-	-	-	-	-
		SS-2	"	"	"	1.5-3.0	"	-	20	-	-	-	-	-	-	-	-
		SS-3	"	"	"	3.5-5.0	Sandy loam	A-4(1)	12	-	16	35	34	16	24	15	9
		SS-4	"	"	"	6.0-7.5	"	"	12	-	-	-	-	-	-	-	-
57		SS-1	254+75	39RT	1044.2	0.0-1.5	Tops[illegible]		2	-	-	-	-	-	-	-	-
		SS-2	"	"	"	1.5-3.0	Clay	A-7-6	4	-	-	-	-	-	-	-	-
		SS-3	"	"	"	3.5-5.0	"	"	6	-	-	-	-	-	-	-	-
		SS-4	"	"	"	6.0-7.5	Sandy loam	A-4	7	-	-	-	-	-	-	-	-
58		SS-1	216+00	20LT	108.1	0.0-1.5	Sandy loam	A-1-b(0)	6	-	-	-	-	-	-	-	-
		SS-2	"	"	"	1.5-3.0	"	"	10	-	-	-	-	-	-	-	-
		SS-3	"	"	"	3.5-5.0	"	"	13	-	35	41	18	7	20	16	4
		SS-4	"	"	"	6.0-7.5	"	A-4	11	-	-	-	-	-	-	-	-

4.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	ROD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
59		SS-1	224+00	20LT	1025.7	0.0-1.5	Sandy loam	A-4	4	-	-	-	-	-	-	-	-
		SS-2	"	"	"	1.5-3.0	"	"	13	-	-	-	-	-	-	-	-
		SS-3	"	"	"	3.5-5.0	"	A-1-b	36	-	-	-	-	-	-	-	-
		SS-4	"	"	"	6.0-7.5	"	"	33	-	-	-	-	-	-	-	-
60		SS-1	238+00	30LT	1037.9	0.0-1.5	Clay loam	A-7-b	6	-	-	-	-	-	-	-	-
		SS-2	"	"	"	1.5-3.0	Sandy loam	A-4	5	-	-	-	-	-	-	-	-
		SS-3	"	"	"	3.5-5.0	"	"	14	-	-	-	-	-	-	-	-
		SS-4	"	"	"	6.0-7.5	"	"	17	-	-	-	-	-	-	-	-
61		SS-1	239+55	155LT	1037.7	0.0-1.5	Sandy loam	A-4	10	-	-	-	-	-	-	-	-
		SS-2	"	"	"	1.5-3.0	"	"	14	-	-	-	-	-	-	-	-
		SS-3	"	"	"	3.5-5.0	"	"	16	-	-	-	-	-	-	-	-
		SS-4	"	"	"	6.0-7.5	"	"	24	-	-	-	-	-	-	-	-

5.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
62		SS-1	241+93	102LT	1044.8	0.0-1.5	Asphalt & crusehdstone	-	21	-	-	-	-	-	-	-	-
		SS-2	"	"	"	1.5-3.0	Sand & gravel	-	[illegible]	[illegible]	[illegible]	-	-	-	-	-	-
		SS-3	"	"	"	3.5-5.0	"	-	13	-	-	-	-	-	-	-	-
		SS-4	"	"	"	6.0-7.5	Sandy loam	A-4	23	-	-	-	-	-	-	-	-
		SS-5	"	"	"	8.5-10.0	"	"	22	-	-	-	-	-	-	-	-
		SS-6	"	"	"	13.5-15.0	"	"	23	-	-	-	-	-	-	-	-
63		SS-1	244+10	294LT	1046.7	0.0-1.5	Clay loam	A-7-6	23	-	-	-	-	-	-	-	-
		SS-2	"	"	"	1.5-3.0	"	"	25	-	-	-	-	-	-	-	-
		SS-3	"	"	"	3.5-5.0	Sandy loam	A-4	14	-	-	-	-	-	-	-	-
		SS-4	"	"	"	6.0-7.5	"	"	15	-	-	-	-	-	-	-	-
64		SS-1	254+80	42LT	1048.8	0.0-1.5	Clay loam	A-7-6	12	-	-	-	-	-	-	-	-
		SS-2	"	"	"	1.5-3.0	Sandy loam	A-4	12	-	-	-	-	-	-	-	-
		SS-3	"	"	"	3.5-5.0	"	"	24	-	-	-	-	-	-	-	-
		SS-4	"	"	"	6.0-7.5	"	"	22	-	-	-	-	-	-	-	-

Appendix A9:
Borehole data for S.R. 1 from U.S. 35 north to U.S. 36

1.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	Soil Description AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
65		-	655+75	75RT	1083.6	0.0-0.9	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.9-3.1	-	A-6(7)	-	-	-	-	-	-	-	-	-
66		-	665+00	14LT	1092.7	0.0-0.4	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.4-3.0	-	A-7-6(14)	-	-	-	-	-	-	-	-	-
67		-	668+00	22RT	1075.6	0.0-1.2	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.2-4.3	-	A-7-6(14)	-	-	-	-	-	-	-	-	-
68		-	671+00	14LT	1085.0	0.0-0.5	Clay loam or clay	A-6(10)	-	-	1	21	48	21	40	25	15
		-	"	"	"	0.5-3.0	Clay	A-7-6(14)	-	-	5	25	35	19	42	18	24
69		-	676+00	13RT	1083.6	0.0-0.4	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
			"	"	"	0.4-3.2	-	A-7-6(14)	-	-	-	-	-	-	-	-	-

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
70		-	683+00	10LT	1081.4	0.0-1.0	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-3.0	-	A-7-6(14)	-	-	-	-	-	-	-	-	-
71		-	695+00	4RT	1085.7	0.0-1.0	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-3.0	-	A-7-6(14)	-	-	-	-	-	-	-	-	-
72		-	700+00	CL	1087.4	0.0-0.7	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.7-1.6	-	A-7-6(14)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.6-3.0	-	A-2-4	-	-	-	-	-	-	-	-	-
73		-	705+00	CL	1084.7	0.0-1.0	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-1.6	-	A-7-6(14)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.6-3.4	Sandy loam	A-2-4	-	-	26	43	19	9	26	17	9
74		-	710-00	DL	1087.1	0.0-1.0	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-2.6	-	A-7-6(14)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.6-5.2	Clay	-	-	-	-	-	-	-	-	-	-

3.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
75		-	718+00	11LT	1100.0	0.0-0.6	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.6-4.2	-	A-7-6(14)	-	-	-	-	-	-	-	-	-
76		-	720+00	CL	1102.8	0.0-0.7	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.7-2.8	-	A-7-6(14)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.8-4.2	Loam	A-4(5)	-	-	4	38	40	10	18	14	4
		-	"	"	"	4.2-5.0	Clay	-	-	-	-	-	-	-	-	-	-

Appendix A10:
Borehole data for S.R. 1 north of Hagerstown

1.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	Soil Description AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Grain Size Distribution Sand	Grain Size Distribution Silt	Grain Size Distribution Clay	LL	PL	PI
77	-	-	518+60	60RT	1028.6	0.0-2.0	Silty clay	A-7-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.0-6.5	"	"	-	-	-	-	-	-	-	-	-
		-	"	"	"	6.5-9.5	Sand & gravel	-	-	-	-	-	-	-	-	-	-
78		-	519+30	60RT	1027.6	0.0-2.5	Silty clay	A-7-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.5-6.5	"	"	-	-	-	-	-	-	24	18	6
		-	"	"	"	6.5-7.5	Clay	A-7-5	-	-	-	-	-	-	35	23	12
		-	"	"	"	7.5-10.5	Sand, gravel & cobbles	-	-	-	-	-	-	-	-	-	-
79		-	[illegible]+25	50RT	1-25.8	0.0-3.5	Silty Clay	A-7-6(17)	-	-	0	7	51	29	42	25	17
		-	"	"	"	3.5-7.0	Clay	A-7-5(32)	-	-	0	4	37	30	60	33	27
		-	"	"	"	7.0-12.5	Silty Clay loam	A-7-6(22)	-	-	0	2	72	16	46	26	20
80		-	520+60	75LT	1026.6	0.0-2.5	Silty clay	A-7-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.5-4.5	Clay	A-7-5	-	-	-	-	-	-	-	-	-
		-	"	"	"	4.5-7.0	Sand & gravel	-	-	-	-	-	-	-	-	-	-

2.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
81		-	521+27	42RT	1026.0	0.0-2.5	Silty clay	A-7-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.5-12.0	Clay	A-7-5	-	-	-	-	-	-	-	-	-
82		-	521+40	55LT	1026.3	0.0-3.0	Fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	3.0-6.5	Clay	A-7-5	-	-	-	-	-	-	-	-	-
		-	"	"	"	6.5-7.5	Silt	-	-	-	-	-	-	-	52	34	18
		-	"	"	"	7.5-9.0	Sandy clay	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	9.0-10.0	Sandy & gravel	-	-	-	-	-	-	-	-	-	-
83		-	522+00	27RT	1025.5	0.0-4.0	Silty clay	A-7-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	4.0-7.0	Clay	A-7-5	-	-	-	-	-	-	-	-	-
		-	"	"	"	7.0-11.0	Silty clay loam	A-7-6	-	-	-	-	-	-	-	-	-
84		-	522+32	84LT	1025.3	0.0-3.5	Silty clay	A-7-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	3.5-5.5	Clay	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	5.5-6.5	"	A-7-5	-	-	-	-	-	-	NP	NP	NP
		-	"	"	"	6.5-11.5	Silty clay loam	A-7-6	-	-	-	-	-	-	-	-	-

3.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
85		-	522+35	60RT	1026.9	0.0-0.5	Fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.5-2.5	Silty clay	A-7-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.5-6.0	Clay	A-7-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	6.0-8.0	Sand & gravel	-	-	-	-	-	-	-	-	-	-
86		-	523+15	82LT	1025.6	0.0-3.0	Silty clay	A-7-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	3.0-6.5	Clay	A-7-5	-	-	-	-	-	-	NP	NP	NP
		-	"	"	"	6.5-7.5	Sand	-	-	-	-	-	-	-	-	-	-
[illegible]		-	524+10	64LT	1027.1	0.0-2.5	Silty clay	A-7-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.5-6.0	Clay	A-7-5	-	-	-	-	-	-	30	17	13
		-	"	"	"	6.0-7.0	Sand & gravel	-	-	-	-	-	-	-	-	-	-

4.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
88		SS-1	521+00	60RT	1025.9	1.0-2.5	Silty Clay	A-7-6	24	-	-	-	-	-	-	-	-
		SS-2	"	"	"	3.5-5.0	Clay w/sand	A-7-5	4	-	-	-	-	-	-	-	-
		SS-3	"	"	"	6.0-7.5	Silty clay loam	A-7-6	2	-	-	-	-	-	-	-	-
		SS-4	"	"	"	8.5-10.5	"	"	-	-	-	-	-	-	-	-	-
		SS-5	"	"	"	11.0-12.5	"	"	2/3	-	-	-	-	-	-	-	-
		SS-6	"	"	"	13.5-15.0	"	"	10	-	-	-	-	-	-	-	-
		SS-7	"	"	"	16.0-17.5	Sand & gravel	-	29	-	-	-	-	-	-	-	-
		SS-8	"	"	"	18.5-20.0	"	-	21	-	-	-	-	-	-	-	-

5.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
89		SS-1	521+70	CL	1024.9	1.0-2.5	Silty clay	A-7-6	21	-	-	-	-	-	-	-	-
		SS-2	"	"	"	3.5-5.0	Clay	A-7-5	3	-	-	-	-	-	-	-	-
		ST-3	"	"	"	6.0-8.0	"	"	-	-	-	-	-	-	NP	NP	NP
		ST-4	"	"	"	8.5-10.5	"	"	-	-	-	-	-	-	-	-	-
		SS-5	"	"	"	11.0-12.5	Silty clay loam	A-7-6	2/1	-	-	-	-	-	-	-	-
		ST-6	"	"	"	13.5-15.5	"	"	-	-	-	-	-	-	61	48	13
		SS-7	"	"	"	16.0-17.5	"	"	2/3	-	-	-	-	-	-	-	-
		SS-8	"	"	"	18.5-20.0	"	"	[illegible]	-	-	-	-	-	-	-	-
		SS-9	"	"	"	21.0-22.5	Sand & gravel	-	[illegible]	-	-	-	-	-	-	-	-
		SS-10	"	"	"	23.5-25.0	"	-	42	-		-	-	-	-	-	-

6.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
90		SS-1	522+30	75LT	1025.31	1.0-2.5	Silty clay	A-7-6	22	-	-	-	-	-	-	-	-
		SS-2	"	"	"	3.5-5.0	Clay	A-7-5	5	-	-	-	-	-	-	-	-
		ST-3	"	"	"	6.0-8.0	Silty clay loam	A-7-6	-	-	-	-	-	-	NP	NP	NP
		ST-4	"	"	"	8.5-10.5	"	"	-	-	-	-	-	-	NP	NP	NP
		SS-5	"	"	"	11.0-12.5	"	"	2/3	-	-	-	-	-	-	-	-
		ST-6	"	"	"	13.5-15.5	"	"	-	-	-	-	-	-	63	40	23
		ST-7	"	"	"	16.0-18.0	"	"	-	-	-	-	-	-	-	-	-
		SS-8	"	"	"	18.5-20.0	Sand & gravel	-	22	-	-	-	-	-	-	-	-

Appendix A11:
Borehole data for S.R. 1 from S.R. 38 at Hagerstown north to north of U.S. 35

1.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	Soil Description AASHTO	Blow per Ft.	ROD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
91		-	363+00	14RT	1063.7	0.0-0.4	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.4-3.2	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
92		-	365+25	17LT	1066.7	0.0-1.1	Clay loam	A-7-6(10)	-	-	2	31	38	23	42	26	16
		-	"	"	"	1.1-5.0	Clay	A-7-6(15)	-	-	3	28	33	21	45	21	24
		-	"	"	"	5.0-5.8	-	A-4(6)	-	-	-	-	-	-	-	-	-
93		-	367+40	30LT	1052.6	0.0-1.2	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.2-6.0	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
94		-	369+00	12RT	1067.3	0.0-0.4	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.4-1.4	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.4-5.2	Clay loam	A-4(6)	-	-	9	32	34	14	20	13	7
95		-	371+85	22RT	1062.4	0.0-1.0	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-5.0	Loam	A-6(8)	-	-	2	31	43	22	34	22	12
		-	"	"	"	5.0-6.0	-	A-7-6(15)	-	-	-	-	-	-	-	-	-

2.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
96	.	-	374+50	13RT	1061.9	0.0-0.5	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.5-1.5	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.5-4.2	-	A-4(6)	-	-	-	-	-	-	-	-	-
97		-	383+00	28RT	1035.2	0.0-1.2	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.2-3.8	Sandy clay loam	A-4(3)	-	-	8	45	26	13	25	15	10
		-	"	"	"	3.8-5.2	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
98		-	385+50	15RT	1052.0	0.0-0.6	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.6-2.4	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.4-3.0	-	A-4(6)	-	-	-	-	-	-	-	-	-
99		-	391+00	22RT	1049.8	0.0-0.8	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.8-2.1	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.1-3.0	-	A-4(3)	-	-	-	-	-	-	-	-	-

3.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	ROD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
100		-	394+00	8LT	1036.2	0.0-1.0	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-5.2	-	A-6(8)	-	-	-	-	-	-	-	-	-
		-	"	"	"	5.2-6.0	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
101		-	397+00	CL	1051.9	0.0-0.7	Gravel	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.7-2.8	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.8-3.4	-	A-4-(3)	-	-	-	-	-	-	-	-	-
102		-	399+00	7LT	1049.2	0.0-0.6	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.6-3.0	-	"	-	-	-	-	-	-	-	-	-
		-	"	"	"	3.0-3.6	-	A-4(6)	-	-	-	-	-	-	-	-	-
103		-	402+75	12LT	1038.0	0.0-1.0	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-2.0	-	A-6(8)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.0-4.4	-	A-4(6)	-	-	-	-	-	-	-	-	-

4.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
104		-	405+00	7LT	1047.0	0.0-1.0	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-3.0	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	3.0-4.2	-	A-4(6)	-	-	-	-	-	-	-	-	-
105		-	408+50	10LT	1047.3	0.0-0.6	Sand & gravel	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.6-1.6	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.6-3.4	-	A-4(6)	-	-	-	-	-	-	-	-	-
106		-	414+00	5LT	1033.6	0.0-0.8	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.8-3.0	-	A-6(8)	-	-	-	-	-	-	-	-	-
107		-	417+60	6LT	1045.5	0.0-1.2	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.2-3.6	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	3.6-4.5	-	A-4(6)	-	-	-	-	-	-	-	-	-

5.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
108	-	-	420+00	12LT	1056.6	0.0-0.8	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.8-2.0	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.0-3.6	-	A-4(6)	-	-	-	-	-	-	-	-	-
109		-	423+75	CL	1047.2	0.0-0.8	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.8-1.8	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.8-3.8	-	A-4(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	3.0-3.8	-	A-4(3)	-	-	-	-	-	-	-	-	-
110		-	427+00	CL	1039.6	0.0-1.2	Topsoil	A-7-6(20)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.2-3.2	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	3.2-4.4	-	A-4(6)	-	-	-	-	-	-	-	-	-
111		-	430+50	CL	1050.3	0.0-0.7	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.7-1.8	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.8-3.4	-	A-4(6)	-	-	-	-	-	-	-	-	-

6.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	ROD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
112		-	434+00	CL	1050.7	0.0-0.7	Gravel	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.7-1.6	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.6-3.7	-	A-4(6)	-	-	-	-	-	-	-	-	-
113		-	436+50	12LT	1043.2	0.0-0.8	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.8-3.2	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
114		-	438+50	10LT	1052.8	0.0-3.2	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
115		-	442+00	CL	1056.1	0.0-0.7	Gravel	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.7-2.8	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
116		-	446+00	CL	1050.9	0.0-0.8	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.2-2.6	-	A-4(3)	-	-	-	-	-	-	-	-	-

7.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
117		-	450+00	CL	1047.1	0.0-0.7	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.7-2.5	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.5-3.2	-	A-4(3)	-	-	-	-	-	-	-	-	-
118		-	455+00	6RT	1038.0	0.0-1.0	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-3.0	-	A-6(8)	-	-	-	-	-	-	-	-	-
119		-	465+50	6LT	1043.0	0.0-0.6	-	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.6-2.4	-	A-4(6)	-	-	-	-	-	-	-	-	-
120		-	468+50	CL	1052.3	0.0-0.6	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.6-4.6	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	4.6-5.2	-	A-4(8)	-	-	-	-	-	-	-	-	-
121		-	472+00	CL	1048.5	0.0-1.0	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-3.2	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	3.2-4.0	-	A-4(6)	-	-	-	-	-	-	-	-	-

8.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
122	-	-	475+50	8RT	1048.9	0.0-1.0	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-2.4	-	A-4(3)	-	-	-	-	-	-	-	-	-
123		-	485+00	CL	1038.3	0.0-0.6	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.6-1.8	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.8-3.0	-	A-4(3)	-	-	-	-	-	-	-	-	-
124		-	490+89	CL	1025.8	0.0-0.9	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.9-2.4	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.4-4.4	-	A-4(3)	-	-	-	-	-	-	-	-	-
125		-	497+00	CL	1026.0	0.0-1.0	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-2.5	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.5-3.0	-	A-4(3)	-	-	-	-	-	-	-	-	-

9.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	ROD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
126	.	-	502+00	CL	1026.9	0.0-1.0	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-2.0	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-3.0	-	A-4(3)	-	-	-	-	-	-	-	-	-
127		-	510+00	CL	1032.5	0.0-1.0	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-3.0	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
128		-	516+00	CL	1036.4	0.0-0.9	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.9-2.3	-	A-7-6(15)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.3-3.0	-	A-4(3)	[illegible]	-	-	-	-	-	-	-	-
129		-	[illegible]	CL	1025.5	0.0-1.1	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.1-4.4	Clay	A-7-6(15)	-	-	2	21	30	26	44	12	21
		-	"	"	"	4.4-5.4	-	A-4(3)	-	-	-	-	-	-	-	-	-

10.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
130		-	530+00	-	1037.6	0.0-0.7	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	-	"	0.7-1.4	-	A-6(7)	-	-	-	-	-	-	-	-	-
		-	"	-	"	1.4-3.0	-	A-4(3)	-	-	-	-	-	-	-	-	-
131		-	536+00	CL	1044.0	0.0-0.8	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.8-3.0	-	A-6(7)	-	-	-	-	-	-	-	-	-
132		-	538+00	CL	1048.0	0.0-0.7	Clay loam	A-6(8)	-	-	10	38	28	15	31	18	13
		-	"	"	"	0.7-3.4	"	A-6(7)	-	-	9	34	27	15	36	21	15
133		-	541+50	CL	1055.3	0.0-1.2	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.2-3.2	-	A-6(7)	-	-	-	-	-	-	-	-	-
		-	"	"	"	3.2-4.0	-	A-4(3)	-	-	-	-	-	-	-	-	-
134		-	549+50	CL	1047.5	0.0-0.9	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.9-2.6	-	A-6(7)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.6-3.4	-	A-4(3)	-	-	-	-	-	-	-	-	-

11.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	ROD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
135		-	558+50	CL	1059.4	0.0-0.8	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.8-2.5	-	A-6(7)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.5-3.2	-	A-4(6)	-	-	-	-	-	-	-	-	-
136		-	561+00	CL	1062.5	0.0-0.9	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.9-2.8	-	A-6(7)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.8-3.6	-	A-4(6)	-	-	-	-	-	-	-	-	-
137		-	563+00	CL	1063.2	0.0-0.8	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.8-2.0	-	A-6(7)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.0-2.8	-	A-4(6)	-	-	-	-	-	-	-	-	-
138		-	565+50	CL	1068.2	0.0-0.7	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.7-1.7	-	A-6(7)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.7-2.4	-	A-4(6)	-	-	-	-	-	-	-	-	-

12.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
139		-	568+00	CL	1057.1	0.0-0.9	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.9-3.1	-	A-6(8)	-	-	-	-	-	-	-	-	-
		-	"	"	"	3.1-3.9	-	A-4(3)	-	-	-	-	-	-	-	-	-
140		-	572+00	CL	1072.3	0.0-0.8	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.8-1.4	-	A-6(7)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.4-2.6	-	A-4(6)		-	-	-	-	-	-	-	-
141		-	576+50	CL	1076.7	0.0-0.8	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.8-2.4	-	A-6(7)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.4-3.2	-	A-4(6)	-	-	-	-	-	-	-	-	-
142		-	578+00	CL	1066.3	0.0-1.0	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-3.2	-	A-6(7)	-	-	-	-	-	-	-	-	-

13.

Boring	Project	Sample	Station	Offset	Ground	Sample	Soil Description		Blow	RQD	Grain Size Distribution						
No.		No.	No.	Ft.	Elevation Ft.	Depth Ft.	Texture	AASHTO	per Ft.	%	Gravel	Sand	Silt	Clay	LL	PL	PI
143		-	590+00	CL	1075.2	0.0-0.7	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.7-2.8	-	A-6(7)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.8-3.4	-	A-4(6)	-	-	-	-	-	-	-	-	-
144		-	597+00	CL	1064.3	0.0-0.9	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.9-2.6	-	A-6(7)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.6-3.0	-	A-4(6)	-	-	-	-	-	-	-	-	-
145		-	604+00	CL	1057.8	0.0-1.2	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.2-3.0	-	A-7-6(13)	-	-	-	-	-	-	-	-	-
		-	"	"	"	3.0-5.3	-	A-4(3)	-	-	-	-	-	-	-	-	-
146		-	607+50	CL	1064.5	0.0-0.8	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.8-2.8	-	A-6(7)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.8-3.7	-	A-4(3)	-	-	-	-	-	-	-	-	-

14.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
147	.	-	614+00	CL	1058.6	0.0-0.6	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.6-1.3	-	A-6(7)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.3-1.9	-	A-4(6)	-	-	-	-	-	-	-	-	-
148		-	620+00	CL	1045.4	0.0-0.9	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.9-3.3	-	A-6(7)	-	-	-	-	-	-	-	-	-
		-	"	"	"	3.3-3.8	-	A-4(3)	-	-	-	-	-	-	-	-	-
149		-	627+00	CL	1045.8	0.0-0.9	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.9-3.5	Clay	A-7-6(20)	-	-	0	8	42	29	61	29	32
		-	"	"	"	3.5-4.5	Sandy loam	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	4.5-5.3	-	A-4(3)	-	-	-	-	-	-	-	-	-
150		-	635+00	CL	1046.8	0.0-1.0	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-5.0	-	A-7-6(20)	-	-	-	-	-	-	-	-	-
		-	"	"	"	5.0-5.8	-	A-4(8)	-	-	-	-	-	-	-	-	-

15.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
151		-	639+00	CL	1052.2	0.0-1.2	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.2-3.3	Sand or sandy loam	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	3.3-3.8	-	A-4-(3)	-	-	-	-	-	-	-	-	-
152		-	642+00	CL	1058.2	0.0-0.8	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.8-2.6	-	A-6(7)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.6-3.4	-	-	-	-	-	-	-	-	-	-	-
153		-	646+00	CL	1067.2	0.0-1.0	Topsoil	A-7-6(10)	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-2.8	-	A-6(7)	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.8-3.4	-	A-4(3)	-	-	-	-	-	-	-	-	-
154		-	653+00	14RT	1091.3	0.0-0.6	Topsoil	A-6(6)	-	-	-	-		-	-	-	-
		-	"	"	"	0.6-2.8	-	A-6(7)	-	-	-	-	-	-	-	-	-

16.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
155		-	655+25	75RT	1083.6	0.0-0.9	Topsoil	A-6(6)	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.9-3.1	-	A-6(7)	-	-	-	-	-	-	-	-	-

Appendix A12: Borehole Data for S.R. 1 Near Cambridge City.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
156		1	[illegible]	CL	997.7	1.5-2.0	fill	A-7-6	-	-	-	-	-	-	-	-	-
		2	"	"	"	2.0-4.0	clay	"	-	-	-	-	-	-	-	-	-
157		1	163+00	2RT	994.7	2.0-4.0	loam	A-4(4)	-	-	-	48	38	14	22	16	6
158		1	166+00	2RT	[illegible]	0.0-2.0	loam	A-6(10)	-	-	-	34	48	18	33	15	18
		2	"	"	"	4.0-6.0	"	A-4	-	-	-	-	-	-	-	-	-
159		1	169+00	2RT		4.0-6.0	clay loam	A-4	-	-	-	-	-	-	-	-	-
160		1	172+00	CL	[illegible]	4.0-6.0	loam	A-4	-	-	-	-	-	-	-	-	-
161		1	175+00	CL	1004.5	0.5-2.0	clay	A-7-6	-	-	-	-	-		-	-	-
		2	"	"	"	2.0-4.0	loam	A-4	-	-	-	-	-	-	-	-	-
162		-	178+00	6LT	1004.5	0.0-2.0	loam	A-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.0-6.0	"	A-4	-	-	-	-	-	-	-	-	-

Appendix A12: Continued.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
163		1	181+00	2RT	1007.0	0.0-2.0	loam	A-6	-	-	-	-	-	-	-	-	-
		2	"	"	"	2.0-4.0	"	"	-	-	-	-	-	-	-	-	-
164		-	184+00	2RT	1009.7	0.0-0.3	fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.3-2.0	clay	A-7-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.0-6.0	loam	A-4	-	-	-	-	-	-	-	-	-
165		1	187+00	CL	1012.7	4.0-6.0	loam	A-4	-	-	-	-	-	-	-	-	-
166		-	190+00	CL	1014.0	0.0-0.3	fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.3-2.0	clay	A-7-6	-	-	-	-	-	-	-	-	.
		-	"	"	"	2.0-5.0	loam	A-4	-	-	-	-	-	-	-	-	-
		-	"	"	"	5.0-6.0	"	"	-	-	-	-	-	-	-	-	-
167		1	193+00	CL	1015.7	4.0-6.0	loam	A-4	-	-	-	-	-	-	-	-	-

Appendix A12: Continued.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
168		1	196+00	1LT	1017.0	4.0-6.0	clay loam	A-4(7)	-	-	-	34	45	21	30	20	10
169		-	199+00	2LT	1022.5	0.0-0.3	fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.3-2.0	loam	A-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.0-6.0	"	A-4	-	-	-	-	-	-	-	-	-
170		-	202+00	2LT	1022.2	0.0-6.0	loam	A-4	-	-	-	-	-	-	-	-	-
171		1	205+20	3LT	1024.3	1.0-2.0	clay	A-7-6(15)	-	-	-	27	43	30	45	21	24
172		1	208+00	3LT	1027.1	2.0-4.0	loam	A-4	-	-	-	-	-	-	-	-	-
		2	"	"	"	4.0-6.0	"	"	-	-	-	-	-	-	-	-	-
173		1	211+00	3LT	1026.0	2.0-4.0	clay	A-7-6	-	-	-	-	-	-	-	-	-
		2	"	"	"	4.0-6.0	clay loam	A-4	-	-	-	-	-	-	-	-	-

Appendix A12: Continued.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
174		Bag	214+00	3LT	1026.5	1.0-5.0	clay loam	A-6(7)	-	-	-	49	29	22	33	15	18
175		1	217+00	CL	1030.0	0.0-2.0	loam	A-4(4)	-	-	-	45	39	16	22	15	7
		2	"	"	"	4.0-6.0	"	A-4	-	-	-	-	-	-	-	-	-
176		1	220+00	CL	1031.2	1.0-2.0	clay	A-7-6	-	-	-	-	-	-	-	-	-
		2	"	"	"	3.0-5.0	"	"	-	-	-	-	-	-	-	-	-
177		1	223+00	2RT	1033.2	4.0-6.0	loam	A-4	-	-	-	-	-	-	-	-	-
178		1	226+00	4RT	1037.1	0.3-2.5	clay loam	A-6	-	-	-	-	-	-	-	-	-
		2	"	"	"	3.0-4.5	clay	A-7-6	-	-	-	-	-	-	-	-	-
		3	"	"	"	5.0-6.0	loam	A-4	-	-	-	-	-	-	-	-	-
179		-	229+00	10RT	1036.1	0.0-6.0	loam	A-4	-	-	-	-	-	-	-	-	-

Appendix A12: Continued.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
180		-	232+00	8RT	1038.0	0.0-0.3	fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.3-6.0	loam	A-4	-	-	-	-	-	-	-	-	-
181		-	233+45	30LT	1034.3	0.0-2.5	sandy loam	-	-	-	-			-	-	-	-
		-	"	"	"	2.5-5.0	sandy clay loam	-	-	-	-		-	-	-	-	-
		-	"	"	"	5.0-6.0	clay	-	-	-	-	-	-	-	-	-	-
182		1	235+00	6RT	1036.7	0.0-2.0	clay loam	A-6(9)	-	-	-	29	44	27	34	20	14
		2	"	"	"	2.0-4.0	clay	A-7-6	-	-	-	-	-	-	-	-	-
		3	"	"	"	4.0-6.0	loam	A-4	-	-	-	-	-	-	-	-	-
183		-	238+00	6RT	1040.8	0.0-0.3	fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	3.0-6.0	loam	A-4	-	-	-	-	-	-	-	-	-
184		1	241+00	4RT	1043.5	3.0-4.0	sandy loam	A-4(1)	-	-	-	65	26	9	NP	NP	NP

Appendix A12: Continued.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
185	·	1	244+00	4RT	1040.5	4.0-6.0	clay	A-7-6	-	-	-	-	-	-	-	-	-
186		-	247+00	3RT	1042.5	0.0-2.0	clay loam	A-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.0-6.0	clay	A-7-6	-	-	-	-	-	-	-	-	-
187		-	250+00	2RT	1042.1	0.0-0.3	fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	-	clay	A-7-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	-	"	"	-	-	-	-	-	-	-	-	-
		-	"	"	"	4.0-6.0	loam	A-4	-	-	-	-	-	-	-	-	-
188		1	253+00	2RT	1038.5	4.0-6.0	clay	A-7-6(12)	-	-	-	35	32	33	44	22	22
189		-	256+00	3RT	1039.0	0.0-0.3	fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.3-2.5	clay loam	A-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	-	clay	A-7-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	-	"	"	-	-	-	-	-	-	-	-	-

Appendix A12: Continued.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	Soil Description AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Grain Size Distribution Sand	Grain Size Distribution Silt	Grain Size Distribution Clay	LL	PL	PI
190		1	259+00	3RT	1045.2	0.5-2.0	clay	A-7-6	-	-	-	-	-	-	-	-	-
		2	"	"	"	4.0-6.0	loam	A-4	-	-	-	-	-	-	-	-	-
191		1	262+00	3RT	1044.5	1.0-3.0	clay	A-7-6	-	-	-	-	-	-	-	-	-
		2	"	"	"	4.0-6.0	"	A-7-6(16)	-	-	-	26	41	33	48	22	26
192		1	265+00	3RT	1048.4	2.0-4.0	sandy loam	A-4	-	-	-	-	-	-	-	-	-
		2	"	"	"	4.0-6.0	"	"	-	-	-	-	-	-	-	-	-
193		1	268+00	3RT	1046.2	0.0-2.0	clay loam	A-6	-	[illegible]	-	-	-	-	-	-	-
		2	"	"	"	2.0-4.0	clay	A-7-6	-	-	-	-	-	-	-	-	-
		3	"	"	"	4.0-6.0	"	"	-	-	-	-	-	-	-	-	-
194		1	271+00	3RT	1045.5	3.0-5.0	clay loam	A-6	-	-	-	-	-	-	-	-	-

Appendix A12: Continued.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
195		1	274+00	4RT	1044.5	5.0-6.0	clay loam	A-6	-	-	-	-	-	-	-	-	-
196		-	277+00	5RT	1045.5	0.0-1.0	fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-6.0	loam	A-4	-	-	-	-	-	-	-	-	-
197		1	280+00	5RT	1042.9	4.0-6.0	clay loam	A-6(9)	-	-	-	38	35	27	30	13	17
198		-	283+00	4RT	1043.0	0.0-1.0	fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.0-3.0	clay	A-7-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	3.0-5.0	"	"	-	-	-	-	-	-	-	-	-
		-	"	"	"	5.0-6.0	clay loam	A-6	-	-	-	-	-	-	-	-	-
199		-	286+00	4RT	1044.3	0.0-0.3	fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.3-2.0	clay	A-7-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.0-3.0	sandy loam	A-4	-	-	-	-	-	-	-	-	-
		-	"	"	"	3.0-6.0	loam	"	-	-	-	-	-	-	-	-	-

Appendix A12: Continued.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
200		-	289+00	4RT	1044.1	0.0-2.5	clay	A-7-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.5-5.0	"	"	-	-	-	-	-	-	-	-	-
		-	"	"	"	5.0-6.0	"	"	-	-	-	-	-	-	-	-	-
201		-	292+00	3RT	1044.5	0.0-1.5	clay	A-7-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.5-4.0	clay loam	A-6	-	-	-	-	-	-	-	-	-
		-	"			4.0-5.0	loam	A-4	-	-	-	-	-	-	-	-	-
		-	"	"	"	5.0-6.0	sandy loam	"	-	-	-	-	-	-	-	-	-
202		-	295+00	3RT	1043.4	0.0-0.3	fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.3-3.0	sandy loam	A-4	-	-	-	-	-	-	-	-	-
		-	"	"	"	3.0-6.0	clay	A-7-6	-	-	-	-	-	-	-	-	-
203		1	298+00	3RT	1044.1	4.0-6.0	sandy loam	A-4	-	-	-	-	-	-	-	-	-

Appendix A12: Continued.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
204		-	300+09	3RT	1039.7	0.0-0.5	fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.5-6.0	sandy loam	A-4	-	-	-	-	-	-	-	-	-
205		-	302+75	3RT	1043.3	0.0-1.5	sandy loam	A-4	-	-	-	-	-	-	-	-	-
		-	"	"	"	1.5-5.0	"	"	-	-	-	-	-	-	-	-	-
		-	"	"	"	5.0-7.0	"	"	-	-	-	-	-	-	-	-	-
		-	"	"	"	7.0-9.0	"	"	-	-	-	-	-	-	-	-	-
		-	"	"	"	9.0-10.0	"	"	-	-	-	-	-	-	-	-	-
206		-	305+00	2RT	1036.5	0.0-0.5	fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.5-6.0	sandy loam	A-4	-	-	-	-	-	-	-	-	-

Appendix A12: Continued.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Grain Size Distribution: Sand	Grain Size Distribution: Silt	Grain Size Distribution: Clay	LL	PL	PI
207	.	1	308+00	6RT	1046.0	0.3-2.0	clay loam	A-6	-	-	-	-	-	-	-	-	-
		2	"	"	"	3.0-4.0	"	"	-	-	-	-	-	-	-	-	-
		3	"	"	"	4.0-6.0	sandy loam	A-4	-	-	-	-		-	-	-	-
		4	"	"	"	7.0-8.0	"	"	-	-	-	-	-	-	-	-	-
		5	"	"	"	8.0-10.0	"	A-2-4(0)	-	-	-	75	17	8	20	12	8
		6	"	"	"	10.5-12.0	"	A-4(3)	-	-	-	53	29	18	20	11	9
		7	"	"	"	12.0-14.0	"	A-[illegible]	-	-	-	-	-	-	-	-	-
208		-	311+00	6RT	1044.[illegible]	[illegible]-0.3	fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.3-6.5	clay loam	A-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	6.5-9.0	sandy loam	A-4	-	-	-	-	-	-	-	-	-
		-	"	"	"	9.0-11.0	"	"	-	-	-	-	-	-	-	-	-
209		1	313+50	30LT	1029.0	0.0-4.0	sandy loam	A-4	-	-	-	-	-	-	-	-	-
		2	"	"	"	4.0-5.5	"	A-4(2)	-	-	-	60	21	19	21	12	9

Appendix A12: Continued.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
210	·	1	317+00	9RT	1043.7	0.0-2.0	clay loam	A-6	-	-	-	-	-	-	-	-	-
211		1	320+00	8RT	1045.8	4.0-6.0	clay loam	A-6	-	-	-	-	-	-	-	-	-
212		-	322+30	25LT	1031.7	0.0-2.0	sandy loam	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.0-3.0	"	-	-	-	-	-	-	-	-	-	-
213		1	322+00	9LT	1039.5	0.0-2.0	sandy loam	A-2-4	-	-	-	-	-	-	-	-	-
214		-	326+00	7RT	1049.5	0.0-3.0	clay loam	A-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	3.0-6.0	sandy loam	A-2-4	-	-	-	-	-	-	-	-	-
215		1	329+00	5RT	1051.5	0.0-1.0	silty loam	A-4(8)	-	-	-	23	60	17	30	20	10
216		1	332+00	3RT	1052.7	0.0-0.5	fill	A-1-b	-	-	-	-	-	-	-	-	-
		2	"	"	"	0.5-6.0	clay	A-6(10)	-	-	-	16	48	36	37	22	15

Appendix A12: Continued.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	ROD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
217		-	335+00	1RT	1055.1	0.0-0.6	clay loam	A-6	-	-	-	-	-	-	-	-	-
218		-	338+00	CL	1047.8	0.0-0.2	fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.2-6.0	clay loam	A-6	-	-	-	-	-	-	-	-	-
219		-	339+50	CL	1043.3	0.0-0.3	fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.3-8.0	clay loam	A-6	-	-	-	-	-	-	-	-	-
220		1	342+00	CL	1057.5	0.0-2.0	sandy loam	A-6(5)	-	-	-	53	34	13	32	15	17
		2	"	"	"	2.0-12.0	clay loam	A-6	-	-	-	-	-	-	-	-	-
221		-	345+00	CL	1047.5	0.0-0.5	fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.5-6.0	clay loam	A-6	-	-	-	-	-	-	-	-	-
222		-	348+00	CL	1048.5	0.0-0.3	fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.3-6.0	clay loam	A-6	-	-	-	-	-	-	-	-	-

Appendix A12: Continued.

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
223		-	351+00	CL	1057.3	0.0-0.5	fill	-	-	-	-	-	-	-	-	-	-
		-	"	"	"	0.5-16.0	clay loam	A-6	-	-	-	-	-	-	-	-	-
224		-	355+00	40LT	1027.0	0.0-2.0	clay loam	A-6	-	-	-	-	-	-	-	-	-
		-	"	"	"	2.0-6.0	sandy loam	A-4	-	-	-	-	-	-	-	-	-
225		1	355+00	CL	1035.0	8.0-10.0	clay loam	A-6	-	-	-	-	-	-	-	-	-
226		1	358+00	CL	1051.5	1.0-6.0	clay loam	A-6(8)	-	-	-	35	38	27	30	17	13
227		1	360+00	15RT	1055.0	0.0-3.0	san	A-1-b(0)	-	-	-	82	14	4	NP	NP	NP

Borehole Data for State Road 1 Southeast of Cambridge City

Appendix A13

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
228	-	1	500+00	17LT	919.5	0.0-5.0	Sand	A-1-b	-	-	-	-	-	-	-	-	-
	-	2	"	"	"	5.0-6.0	"	"	-	-	-	-	-	-	-	-	-
229	-	-	503+00	15RT	915.9	0.0-0.5	Sand	A-1-b	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.5-6.0	"	"	-	-	-	-	-	-	-	-	-
230	-	1	506+00	15LT	914.8	0.0-0.5	Clay loam	A-7-5	-	-	-	-	-	-	-	-	-
	-	2	"	"	"	0.5-6.0	Sandy loam	A-6	-	-	-	-	-	-	-	-	-
231	-	1	509+00	4RT	912.3	0.0-2.0	Clay loam	A-7-5	-	-	-	-	-	-	-	-	-
	-	2	"	"	"	2.0-4.0	Clay loam	A-6	-	-	-	-	-	-	-	-	-
	-	3	"	"	"	5.0-6.0	Sandy loam	A-6(3)	-	-	-	56	29	15	26	13	13
232	-	1	512+00	4RT	913.8	4.0-6.0	Sand	A-1-b	-	-	-	-	-	-	-	-	-
.																	

Appendix A13

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
233	-	-	516+00	4RT	909.5	0.0-1.0	Sand	A-1-b	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.0-4.0	Sandy loam	A-6	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	4.0-10.0	Sand	A-1-b	-	-	-	-	-	-	-	-	-
234	-	-	518+00	4RT	911.1	0.0-0.2	Clay loam	A-7-5	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.2-6.0	Sandy loam	A-6	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	6.0-10.0	Sand	A-1-b	-	-	-	-	-	-	-	-	-
235	-	-	521+00	4RT	929.5	0.0-2.0	Clay loam	A-6	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.0-6.0	Sand	A-1-b	-	-	-	-	-	-	-	-	-
236	-	-	524+00	4RT	940.9	0.0-2.0	Clay loam	A-7-5(11)	-	-	-	39	41	20	50	31	19
	-	-	"	"	"	2.0-4.0	Sandy loam	A-6	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	6.0-8.0	Sand	A-1-b(0)	-	-	-	88	7	5	NP	NP	NP

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
237	-	1	527+00	4RT	944.2	0.0-2.0	Clay loam	A-7-5	-	-	-	-	-	-	-	-	-
	-	2	"	"	"	2.0-[illegible]	Sandy clay	A-7-6	-	-	-	-	-	-	-	-	-
	-	3	"	"	"	6.0-8.0	Clay loam	A-6(5)	-	-	-	43	33	24	24	13	11
238	-	1	530+00	4RT	954.5	0.0-0.5	Clay loam	A-7-5	-	-	-	-	-	-	-	-	-
	-	2	"	"	"	1.0-8.0	Sandy clay	A-7-6(9)	-	-	-	51	12	37	42	24	18
	-	3	"	"	"	12.0-23.	Sand	A-1-b	-	-	-	-	-	-	-	-	-
239	-	1	533+00	4RT	952.5	1.0-3.0	Sandy clay	A-7-6	-	-	-	-	-	-	-	-	-
	-	2	"	"	"	6.0-8.0	Clay loam	A-6	-	-	-	-	-	-	-	-	-
240	-	1	536+00	4RT	945.7	4.0-6.0	Clay loam	A-6	-	-	-	-	-	-	-	-	-
241	-	-	536+75	30RT	941.0	0.0-1.5	Clay loam	A-7-5	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.5-5.0	"	A-6	-	-	-	-	-	-	-	-	-

Appendix A13

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
242	-	-	537+50	4RT	944.7	0.5-2.0	Clay loam	A-6	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.0-6.0	Sandy loam	"	-	-	-	-	-	-	-	-	-
243	-	-	539+00	4RT	947.9	0.5-1.5	Clay loam	A-7-5	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.5-3.0	Sandy loam	A-6	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.0-6.0	Clay loam	"	-	-	-	-	-	-	-	-	-
244	-	-	540+55	30RT	947.7	0.0-6.0	Clay loam	A-7-5	-	-	-	-	-	-	-	-	-
245	-	-	542+00	4RT	956.3	0.3-1.0	Clay loam	A-7-5	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.0-4.0	Sandy loam	A-6	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	4.0-6.0	Clay loam	"	-	-	-	-	-	-	-	-	-
246	-	-	545+00	4RT	947.8	0.0-0.5	Clay loam	A-7-5	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.5-11.0	Sandy clay	A-7-6	-	-	-	-	-	-	-	-	-

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
247	-	-	547+50	30LT	940.2	0.0-5.0	Clay loam	A-7-5	-	-	-	-	-		-	-	-
248	-	1	548+00	4RT	950.0	2.0-4.0	Clay loam	A-6	-	-	-	-	-	-	-	-	-
	-	2	"	"	"	4.0-6.0	Silty clay	A-6(10	-	-	-	17	52	36	36	21	15
	-	3	"	"	"	16.0-18.0	Silty clay	A-6	-	-	-	-	-	-	-	-	-
249	-	-	551+00	4RT	955.0	0.0-14.0	Clay loam	A-6	-	-	-	-	-	-	-	-	-
250	-	1	554+00	4RT	950.0	5.0-7.0	Silty clay	A-6	-	-	-	-	-	-	-	-	-
	-	2	"	"	"	7.0-[illegible]	Clay loam	A-7-5	-	-	-	-	-	-	-	-	-
	-	3	"	"	"	8.0-10.0	clay loam	A-7-5(15)	-	-	-	32	39	29	66	44	22
	-	4	"	"	"	11.0-12.0	clay loam	A-7-5	-	-	-	-	-	-	-	-	-

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
251	-	1	554+25	4RT	950.7	7.3-9.0	Peat	-	-	-	-	-	-	-	-	-	-
	-	2	"	"	"	9.0-10.0	"	-	-	-	-	-	-	-	-	-	-
	-	3 top	"	"	"	10.0-11.0	"	-	-	-	-	-	-	-	396	330	66
	-	3 bot	"	"	"	11.0-12.0	Clay loam	A-7-5	-	-	-	-	-	-	-	-	-
	-	4	"	"	"	12.0-13.0	"	"	-	-	-	-	-	-	-	-	-
	-	5	"	"	"	13.0-15.0	"	"	-	-	-	-	-	-	-	-	-
	-	6	"	"	"	15.0-16.5	"	A-6	-	-	-	-	-	-	-	-	-
252	-	-	557+00	4RT	964.3	0.5-6.0	Clay loam	A-6	-	-	-	-	-	-	-	-	-
253	-	-	560+00	10LT	966.3	0.5-8.0	Sandy loam	A-6	-	-	-	-	-	-	-	-	-

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
254	-	1	553+33	7RT	950.0	5.0-10.0	Sand & gravel	-	32	-	-	-	-	-	-	-	-
	-	2	"	"	"	10.0-15.0	Clay	-	7	-	-	-	-	-	-	-	-
	-	3	"	"	"	15.0-20.0	Sandy clay	-	7	-	-	-	-	-	-	-	-
	-	4	"	"	"	20.0-25.0	"	-	6	-	-	-	-	-	-	-	-
	-	5	"	"	"	25.0-30.0	Sandy silt	-	7	-	-	-	-	-	-	-	-
	-	6	"	"	"	30.0-35.0	Sand & gravel	-	13	-	-	-	-	-	-	-	-
	-	7	"	"	"	35.0-40.0	"	-	18	-	-	-	-	-	-	-	-
	-	8	"	"	"	40.0-45.0	"	-	19	-	-	-	-	-	-	-	-
	-	9	"	"	"	45.0-48.5	"	-	16	-	-	-	-	-	-	-	-
	-	10	"	"	"	48.5-50.0	"	-	23	-	-	-	-	-	-	-	-

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
255	-	1	553+91.3	7LT	949.6	5.0-10.0	Peat	-	2	-	-	-	-	-	-	-	-
	-	2	"	"	"	10.0-15.0	Marl & silt	-	2	-	-	-	-	-	-	-	-
	-	3	"	"	"	15.0-20.0	Sandy clay	-	8	-	-	-	-	-	-	-	-
	-	4	"	"	"	20.0-25.0	"	-	12	-	-	-	-	-	-	-	-
	-	5	"	"	"	25.0-30.0	Sand & gravel	-	38	-	-	-	-	-	-	-	-
	-	6	"	"	"	30.0-33.5	"	-	27	-	-	-	-	-	-	-	-
	-	7	"	"	"	33.5-35.0	"	-	24	-	-	-	-	-	-	-	-
256	-	1A	518+23	10LT	910.6	-	Sand & gravel	-	21	-	-	-	-	-	-	-	-
	-	1B	"	"	"	-	"	-	-	-	-	-	-	-	-	-	-
	-	2	"	"	"	10.0-15.0	"	-	28	-	-	-	-	-	-	-	-
	-	3	"	"	"	15.0-20.0	"	-	34	-	-	-	-	-	-	-	-
	-	4	"	"	"	20.0-25.0	"	-	25	-	-	-	-	-	-	-	-
	-	5	"	"	"	25.0-28.5	"	-	56	-	-	-	-	-	-	-	-
	-	6	"		"	28.5-30.0	"	-	43	-	-	-	-	-	-	-	-

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
257	-	1A	518+82	8RT	911.0	-	Sand	-	15	-	-	-	-	-	-	-	-
	-	1B	"	"	"	–	"	-	-	-	-	-	-	-	-	-	-
	-	2	"	"	"	10.0-15.0	Sand & gravel	-	8	-	-	-	-	-	-	-	-
	-	3	"	"	"	15.0-20.0	"	-	13	-	-	-	-	-	-	-	-
	-	4	"	"	"	20.0-25.0	Silt with sand	-	42	-	-	-	-	-	-	-	-
	-	5	"	"	"	25.0-30.0	Sand	-	35	-	-	-	-	-	-	-	-
	-	6	"	"	"	30.0-35.0	"	-	36	-	-	-	-	-	-	-	-
	-	7	"	"	"	35.0-40.0	"	-	25	-	-	-	-	-	-	-	-
	-	8	"	"	"	40.0-45.0	Silt	-	41	-	-	-	-	-	-	-	-
	-	9	"	"	"	45.0-48.0		-	24	-	-	-	-	-	-	-	-
	-	10	"	"	"	48.5-50.0	"	-	41	-	-	-	-	-	-	-	-

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
258	-	1	519+73	10LT	908.7	0.0-2.5	Silty sand & gravel	-	-	-	-	-	-	-	-	-	-
	-	2	"	"	"	2.5-5.0	Sand & gravel	-	7	-	-	-	-	-	-	-	-
	-	3	"	"	"	5.0-10.0	"	-	10	-	-	-	-	-	-	-	-
	-	4	"	"	"	10.0-15.0	Gravel & sand	-	31	-	-	-	-	-	-	-	-
	-	5	"	"	"	15.0-20.0	Silt & gravel	-	77	-	-	-	-	-	-	-	-
	-	6	"	"	"	20.0-25.0	"	-	71	-	-	-	-	-	-	-	-
	-	7	"	"	"	25.0-30.0	"	-	47	-	-	-	-	-	-	-	-
	-	8	"	"	"	30.0-35.0	Sand & gravel	-	34	-	-	-	-	-	-	-	-
	-	9	"	"	"	35.0-36.5	"	-	43	-	-	-	-	-	-	-	-

Borehole Date for S. R. 38 From Hagerstown East to Greensfork
Appendix A 14

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
259	-.	-	140+50	28LT	982.4	0.0-1.6	Topsoil	A-5(4)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.6-4.3	Gravel & Stones	-	-	-	-	-	-	-	-	-	-
260	-	-	144+00	16RT	997.8	0.0-1.2	Sandy loam or loam	A-5(4)	-	-	14	37	37	10	41	31	10
	-	-	"	"	"	1.2-3.0	Sandy loam	A-6(2)	-	-	11	52	26	7	36	23	13
	-	-	"	"	"	3.0-3.6	Gravel & Stones	-	-	-	-	-	-	-	-	-	-
261	-	-	150+00	14RT	1002.3	0.0-0.3	Topsoil	A-5(4)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.3-1.4	-	A-6(2)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.4-1.7	Gravel & Stones	-	-	-	-	-	-	-	-	-	-
262	-	-	151+85	28LT	997.7	0.0-2.4	Fill	A-6(2)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.4-5.5	Organic Sandy Loam	A-7-5(5)	-	-	1	55	30	11	72	56	16
	-	-	"	"	"	5.5-13.3	Organic Silty Loam	A-7-5(11)	-	-	2	27	54	13	49	36	13

Appendix A14 Continued

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
263	-	-	151+85	40RT	993.5	0.0-4.0	-	A-7-5(5)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	4.0-7.7	-	A-7-5(11)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	7.7-9.0	-	A-6(2)	-	-	-	-	-	-	-	-	-
264	-	-	156+00	13LT	1023.9	0.0-0.8	Topsoil	A-5(4)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.8-6.0	-	A-6(2)	-	-	-	-	-	-	-	-	-
265	-	-	158+00	14LT	1036.1	0.0-5.8	Clay loam	A-4(5)	-	-	15	29	33	14	21	14	7
266	-	-	160+00	CL	1045.3	0.0-1.1	Topsoil	A-5(4)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.1-3.7	-	A-6(2)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.7-5.3	-	A-4(5)	-	-	-	-	-	-	-	-	-
267	-	-	168+00	CL	1062.2	0.0-0.7	Topsoil	A-5(4)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.7-3.3		A-6(2)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.3-4.4		A-4(5)	-	-	-	-	-	-	-	-	-

Appendix A14 Continued

Page 3

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
268	-	-	172+00	CL	1064.4	0.0-0.7	Topsoil	A-4(5)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.7-2.1	-	A-6(2)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.1-2.8	-	A-4(5)	-	-	-	-	-	-	-	-	-
269	-	-	173+50	CL	1050.8	0.0-1.1	Topsoil	A-4(5)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.1-2.0	-	A-6(2)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.0-2.6	-	A-4(5)	-	-	-	-	-	-	-	-	-
270	-	-	175+00	CL	1073.7	0.0-0.7	Topsoil	A-5(4)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.7-2.1	-	A-6(2)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.1-4.6	-	A-4(5)	-	-	-	-	-	-	-	-	-
271	-	-	182+00	10RT	1095.2	0.0-0.5	Loam	A-4(6)	-	-	7	34	41	14	30	24	6
	-	-	"	"	"	0.5-1.8	Clay loam	A-7-6(9)	-	-	9	32	38	15	41	23	18
	-	-	"	"	"	1.8-4.6	"	A-4(5)	-	-	9	32	36	17	24	15	9

Appendix A14 Continued

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
272	-	-	184+00	23LT	1095.2	0.0-0.7	Topsoil	A-4(6)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.7-1.4	-	A-7-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.9-4.2	-	A-4(5)									
273	-	-	186+00	14LT	1097.3	0.0-0.5	Topsoil	A-4(6)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.5-1.6	-	A-7-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.6-5.0	-	A-4(5)	-	-	-	-	-	-	-	-	-
274	-	-	188+00	13RT	1097.1	0.0-0.8	Fill	A-7-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.8-1.7	Topsoil	A-4(6)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.7-4.5	-	A-7-6(9)	-	-	-	-	-	-	-	-	-
275	-	-	195+00	13RT	1093.8	0.0-1.3	Fill	A-7-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.3-2.0	Topsoil	A-4(6)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.0-3.5	-	A-7-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.5-4.3	-	A-4(5)	-	-	-	-	-	-	-	-	-

Appendix A14 Continued

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	Soil Description: AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
276	-	-	199+00	12LT	1093.1	0.0-1.2	Topsoil	A-4(6)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.2-3.5	-	A-7-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.5-5.4	-	A-4(5)	-	-	-	-	-	-	-	-	-
277	-	-	205+00	CL	1085.4	0.0-1.2	Loam or clay loam	A-7-5(9)	-	-	13	29	38	17	51	37	14
	-	-	"	"	"	1.2-6.0	Loam	A-7-6(9)	-	-	10	32	41	15	42	24	18
278	-	-	210+00	10RT	1082.5	0.0-1.3	Topsoil	A-7-5(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.3-6.0	-	A-7-6(9)	-	-	-	-	-	-	-	-	-
279	-	-	221+00	18LT	1081.9	0.0-0.8	Topsoil	A-4(6)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.8-3.1	-	A-7-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.1-4.5	-	A-4(5)	-	-	-	-	-	-	-	-	-
280	-	-	224+00	13RT	1079.7	0.0-0.5	Gravel & Clay	-	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.5-1.6	-	A-7-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.6-3.8	-	A-4 (5)	-	-	-	-	-	-	-	-	-

Appendix A14 Continued

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
281	-	-	230+00	16RT	1062.1	0.0-3.0	-	A-4(5)	-	-	-	-	-	-	-	-	-
282	-	-	232+50	28LT	1058.3	0.0-1.4	Topsoil	A-4(6)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.4-4.4	-	A-7-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	4.4-6.0		A-4(5)	-	-	-	-	-	-	-	-	-
283	-	-	238+00	14LT	1057.7	0.0-0.3	Topsoil	A-4(6)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.3-1.7	-	A-7-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.7-4.5	-	A-4(5)	-	-	-	-	-	-	-	-	-
284	-	-	242+50	28LT	1048.7	0.0-1.5	Topsoil	A-4(6)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.5-3.6	-	A-7-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.6-6.0	-	A-4(5)	-	-	-	-	-	-	-	-	-
285	-	-	246+00	14RT	1053.6	0.0-0.6	-	A-7-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.6-3.6	-	A-4(5)	-	-	-	-	-	-	-	-	-

Appendix A14 Continued

Boring	Project	Sample	Station	Offset	Ground	Sample	Soil Description		Blow	RQD	Grain Size Distribution						
No.		No.	No.	Ft.	Elevation Ft.	Depth Ft.	Texture	AASHTO	per Ft	%	Gravel	Sand	Silt	Clay	LL	PL	PI
286	-	-	257+00	21RT	1037.5	0.0-1.4	Topsoil	A-4(6)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.4-3.2	-	A-7-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.2-4.9	-	A-4(5)	-	-	-	-	-	-	-	-	-
287	-	-	268+00	14LT	1038.6	0.0-0.7	Topsoil	A-4(6)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.7-3.2	-	A-7-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.2-3.9	-	A-6(2)	-	-	-	-	-	-	-	-	-
288	-	-	277+00	24LT	1031.9	0.0-0.9	Topsoil	A-4(6)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.9-2.8	-	A-7-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.8-4.1	-	A-6(2)	-	-	-	-	-	-	-	-	-
289	-	-	2[illegible]4+00	8 RT	1030.2	0.0-1.0	Silty Loam	A-4(7)	-	-	8	25	52	12	32	22	10
	-	-	"	"	"	1.0-2.6	Loam	A-6(7)	-	-	10	28	45	11	32	20	12
	-	-	"	"	"	2.6-4.7	Sandy Loam	A-6(4)	-	-	15	42	32	7	39	25	14

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
290	-	-	300+00	30LT	1008.3	0.0-1.2	Topsoil	A-4(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.2-3.3	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.3-3.8	-	A-6(4)	-	-	-	-	-	-	-	-	-
291	-	-	309+00	-	1007.7	0.0-1.5	Topsoil	A-4(7)	-	-	-	-	-	-	-	-	-
	-	-	"	-	"	1.5-2.6	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	-	"	2.6-5.0	-	A-6(4)	-	-	-	-	-	-	-	-	-
292	-	-	341+00	28LT	1031.5	0.0-0.2	Topsoil	A-4(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.8-3.1	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.1-3.7	-	A-6(4)	-	-	-	-	-	-	-	-	-
293	-	-	343+00	20RT	1041.0	0.0-0.5	Gravel & clay	-	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	.05-1.3	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.3-5.9	-	A-6(40	-	-	-	-	-	-	-	-	-

Appendix A14 Continued

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	Soil Description AASHTO	Blow per Ft.	ROD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
294	-	-	347+00	10LT	1035.7	0.0-1.3	Topsoil	A-4(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.3-3.2	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.2-3.7	-	A-6(4)	-	-	-	-	-	-	-	-	-
295	-	-	352+00	CL	1051.2	0.0-3.9	-	A-6(4)	-	-	-	-	-	-	-	-	-
296	-	-	361+00	-	1063.7	0.0-.12	Topsoil	A-4(7)	-	-	-	-	-	-	-	-	-
	-	-	"	-	"	1.2-2.4	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	-	"	2.4-4.5	-	A-6(4)	-	-	-	-	-	-	-	-	-
297	-	-	365+00	CL	1065.8	0.0-1.4	Fill	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.4-2.1	Topsoil	A-4(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.1-4.0	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	4.0-4.5	-	[illegible]	-	-	-	-	-	-	-	-	-

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
298	-	-	368+00	4RT	1068.8	0.0-0.7	Gravel & Clay	-	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.7-1.8	Topsoil	A-4(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.8-4.1	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	4.1-4.9	-	A-6(4)	-	-	-	-	-	-	-	-	-
299	-	-	372+25	20RT	1060.1	0.0-1.5	Topsoil	A-4(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.5-3.3	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.3-4.7	-	A-6(4)	-	-	-	-	-	-	-	-	-
300	-	-	390+00	14RT	1080.3	0.0-1.3	Fill	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.3-2.0	Topsoil	A-4(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.0-4.5	-	A-6(7)	-	-	-	-	-	-	-	-	-
301	-	-	394+75	22RT	1080.2	0.0-1.0	Topsoil	A-4(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.0-2.4	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.4-3.6	-	A-6(4)	-	-	-	-	-	-	-	-	-

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
302	-	-	399+00	13RT	1084.7	0.0-0.8	Topsoil	A-4(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.8-2.1	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.1-3-4	-	A-6(4)	-	-	-	-	-	-	-	-	-
303	-	-	402+25	12RT	1078.1	0.0-1.5	Topsoil	A-4(7)	-	-	-	-	-	-	-	-	-
	-	-		"	"	1.5-3.5	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.5-6.0	-	A-6(4)	-	-	-	-	-	-	-	-	-
304	-	-	408+00	CL	1085.2	0.0-0.9	Topsoil	A-4(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.9-2.6	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.6-4.5	-	A-6(4)	-	-	-	-	-	-	-	-	-
305	-	-	414+00	4LT	1080.5	0.0-1.0	Topsoil	A-4(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.0-3.4	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.4-6.7	-	A-6(4)	-	-	-	-	-	-	-	-	-

Appendix A14 Continued

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
306	-	-	420+50	38RT	1058.1	0.0-3.2	Silty loam	A-4(6)	-	-	5	25	54	12	34	26	8
	-	-	"	"	"	3.2-6.0	Sandy loam	A-4(1)	-	-	20	42	26	9	27	20	7
307	-	-	427+00	3LT	1068.8	0.0-2.5	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.5-5.2	-	A-6(4)	-	-	-	-	-	-	-	-	-
308	-	-	431+00	4LT	1061.3	0.0-0.8	Topsoil	A-4(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.8-3.5	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.5-6.0	-	A-6(4)	-	-	-	-	-	-	-	-	-
309	-	-	437+00	CL	1053.0	0.0-1.1	Topsoil	A-4(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.1-3.3	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.3-7.4	-	A-6(4)	-	-	-	-	-	-	-	-	-
310	-	-	443+00	10LT	1025.0	0.0-2.1	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.1-2.9	-	A-6(7)	-	-	-	-	-	-	-	-	-

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
311	-	-	446+00	14LT	1011.1	0.0-3.0	-	A-6(4)	-	-	-	-	-	-	-	-	-
312	-	-	428+00	27RT	1001.1	0.0-1.3	Topsoil	A-4(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.3-3.6	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.6-6.0	-	A-6(4)	-	-	-	-	-	-	-	-	-
313	-	-	457+00	45LT	998.4	0.0-1.0	Topsoil	A-4(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.0-2.6	-	A-6(7)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.6-3.2	-	A-6(4)	-	-	-	-	-	-	-	-	-

Borehold Date For U. S. 27 From 1.8 Miles North of Junction With State Road 6327 to 0.02 Miles South of the Wayne-Randolph

County Line - Appendix A15

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	Soil Description AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
314	-	-	350+00	CL	1133.8	0.0-0.5	Topsoil	A-4(8)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.5-3.0	-	A-6(9)	-	-	-	-	-	-	-	-	-
315	-	-	355+00	CL	1130.2	0.0-1.0	Topsoil	A-4(8)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.0-3.3	-	A-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.3-4.8	-	A-4(5)	-	-	-	-	-	-	-	-	-
316	-	-	358+00	CL	-	0.0-1.0	Clay loam	A-4(8)	-	-	3	27	43	17	35	32	3
	-	-	"	"	-	1.0-3.0	"	A-6(9)	-	-	4	35	32	20	32	15	17
	-	-	"	"	-	3.0-5.1	Sandy loam	A-4(3)	-	-	13	43	29	8	19	12	7
	-	-	"	"	-	5.1-7.0	Clay loam	A-4(5)	-	-	11	31	36	13	21	13	8
317	-	-	365+00	CL	1129.9	0.0-1.0	Topsoil	A-4(8)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.1-2.0	-	A-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.0-5.3	-	A-4(5)	-	-	-	-	-	-	-	-	-

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Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
318	-	-	370+00	CL	1129.4	0.0-1.0	Topsoil	A-4(8)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.0-2.0	-	A-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.2-3.0	-	A-4(3)	-	-	-	-	-	-	-	-	-

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Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description: Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution: Gravel	Sand	Silt	Clay	LL	PL	PI
319	-	-	383+00	CL	1110.7	0.0-1.2	Topsoil	A-4(8)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.2-2.9	-	A-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.9-4.4	-	A-4(3)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	4.4-5.2	-	A-4(5)	-	-	-	-	-	-	-	-	-
320	-	-	385+00	CL	1115.8	0.0-0.8	Topsoil	A-4(8)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.8-2.5	-	A-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.5-3.2	-	A-4(3)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.2-4.6	-	A-4(5)	-	-	-	-	-	-	-	-	-
321	-	-	395+00	CL	1091.6	0.0-0.9	Topsoil	A-4(8)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.9-3.0	-	A-6(9)	-	-	-	-	-	-	-	-	-
322	-	-	400+00	CL	1087.3	0.0-1.2	Topsoil	A-6(8)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.2-3.0	-	A-7-6(14)	-	-	-	-	-	-	-	-	-

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Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	ROD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
323	-	-	405+00	CL	1083.2	0.0-1.0	Topsoil	A-6(8)	-	-	4	28	44	18	38	25	13
	-	-	"	"	"	1.0-3.8	-	A-7-6(14	-	-	10	23	36	16	45	19	26
	-	-	"	"	"	3.8-6.0	-	A-4(3)	-	-	-	-	-	-	-	-	-
324	-	-	415+00	CL	1086.9	0.0-1.2	Topsoil	A-6(8)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.2-3.0	-	A-7-6(14	-	-	-	-	-	-	-	-	-
325	-	-	420+00	CL	1090.5	0.0-1.1	Topsoil	A-6(8)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.1-3.0	-	A-7-6([illegible]	-	-	-	-	-	-	-	-	-
326	-	-	430+00	CL	1087.6	0.0-1.3	Topsoil	A-6(8)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.3-4.0	-	A-7-6(14	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	4.0-6.0	-	A-4(3)	-	-	-	-	-	-	-	-	-
327	-	-	464+50	-	1109.5	0.0-1.3	Topsoil	A-6(8)	-	-	-	-	-	-	-	-	-
	-	-	"	-	"	1.3-3.6	-	A-7-6(14	-	-	-	-	-	-	-	-	-
	-	-	"	-	"	3.6-4.9	-	A-6(6)	-	-	-	-	-	-	-	-	-

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
328	-	-	480+00	CL	1134.6	0.0-0.9	Clay	A-6(10)	-	-	2	23	39	20	34	18	16
	-	-	"	"	"	0.9-3.0	-	A-6(12)	-	-	2	13	46	23	38	18	20
329	-	-	482+00	CL	1139.9	0.0-0.8	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.8-3.3	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.3-5.0	Clay loam	A-6(6)	-	-	9	29	35	15	25	14	11
330	-	-	487+00	CL	1143.8	0.0-0.9	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.9-3.0	-	A-6(12)	-	-	-	-	-	-	-	-	-
331	-	-	492+00	5LT	1152.2	0.0-1.1	Fill	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.1-2.0	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.0-3.0	-	A-6(12)	-	-	-	-	-	-	-	-	-
332	-	-	497+00	18LT	1156.9	0.0-1.0	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.0-2.9	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.9-4.0	-	A-6(6)	-	-	-	-	-	-	-	-	-

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
333	-	-	503+00	CL	1157.8	0.0-0.6	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.6-2.8	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.8-4.2	-	A-6(6)	-	-	-	-	-	-	-	-	-
334	-	-	506+00	CL	1159.0	0.0-0.7	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.7-2.3	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.3-4.0	-	A-6(6)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	4.0-5.5	-	A-4(3)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	5.5-6.0	-	A-6(6)	-	-	-	-	-	-	-	-	-
335	-	-	508+00	CL	1161.5	0.0-1.0	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.0-2.0	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.0-5.1	-	A-6(6)	-	-	-	-	-	-	-	-	-
336	-	-	510+00	CL	1152.5	0.0-0.8	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.8-1.5	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.5-3.6	-	A-6(6)	-	-	-	-	-	-	-	-	-

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
337	-	-	513+50	CL	1139.8	0.0-1.4	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.4-2.3	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.3-3.4	-	A-6(6)	-	-	-	-	-	-	-	-	-
338	-	-	520+00	CL	1150.4	0.0-0.7	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.7-2.6	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.6-3.0	-	A-6(6)	-	-	-	-	-	-	-	-	-
339	-	-	529+00	CL	1164.9	0.0-1.0	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.0-2.5	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.5-4.6	-	A-6(6)	-	-	-	-	-	-	-	-	-
340	-	-	532+00	CL	1168.8	0.0-0.8	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.8-2.1	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.1-5.1	-	A-6(6)	-	-	-	-	-	-	-	-	-

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Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
341	-	-	535+00	CL	1169.5	0.0-1.2	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.2-4.5	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	4.5-5.0	-	A-6(6)	-	-	-	-	-	-	-	-	-
342	-	-	538+00	CL	1174.6	0.0-0.8	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.8-2.2	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.2-4.3	-	A-6(6)	-	-	-	-	-	-	-	-	-
343	-	-	541+00	CL	1175.6	0.0-1.0	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.0-2.7	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.7-4.1	-	A-6(6)	-	-	-	-	-	-	-	-	-
344	-	-	546+00	CL	1171.3	0.0-1.3	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.3-4.0	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	4.0-4.9	-	A-6(6)	-	-	-	-	-	-	-	-	-

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
345	-	-	555+00	3RT	1188.7	0.0-0.5	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.5-1.4	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.4-4.0	-	A-6(6)	-	-	-	-	-	-	-	-	-
346	-	-	557+00	3RT	1191.4	0.0-0.5	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.5-1.1	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.1-3.2	-	A-6(6)	-	-	-	-	-	-	-	-	-
347	-	-	565+00	CL	1198.5	0.0-0.5	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.5-2.6	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.6-3.0	-	A-6(6)	-	-	-	-	-	-	-	-	-
348	-	-	573+00	CL	1200.8	0.0-0.5	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.5-1.2	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.2-3.0	-	A-6(6)	-	-	-	-	-	-	-	-	-

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
349	-	-	576+00	CL	1200.0	0.0-0.5	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.5-1.0	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.0-3.0	-	A-6(6)	-	-	-	-	-	-	-	-	-
350	-	-	577+50	CL	1197.2	0.0-0.5	Clay	A-7-6(12)	-	-	6	20	41	22	46	29	17
	-	-	"	"	"	0.5-4.0	Silty clay Silty loam	A-7-6(14)	-	-	1	16	53	19	47	26	21
	-	-	"	"	"	4.0-6.0	Clay loam	A-6(8)	-	-	4	27	42	14	28	17	11
351	-	-	581+00	5RT	1196.7	0.0-1.0	Topsoil	A-7-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.0-1.8	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.8-4.0	-	A-7-6(14)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	4.0-6.0	-	A-6(8)	-	-	-	-	-	-	-	-	-
352	-	-	585+00	CL	1200.0	0.0-0.7	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.7-2.0	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.0-3.0	-	A-6(6)	-	-	-	-	-	-	-	-	-

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Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
353	-	-	590+00	CL	1205.3	0.0-0.5	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.5-2.5	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.5-3.0	-	A-6(6)	-	-	-	-	-	-	-	-	-
354	-	-	607+00	CL	1222.0	0.0-1.0	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.0-5.0	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	5.0-5.5	-	A-6(6)	-	-	-	-	-	-	-	-	-
355	-	-	612+00	CL	1219.8	0.0-0.8	Topsoil	A-6(10)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.8-1.4	-	A-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.4-4.0	-	A-6(6)	-	-	-	-	-	-	-	-	-
356	-	-	615+00	CL	1212.3	0.0-0.6	Topsoil	A-7-6(12)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.6-2.5	-	A-7-6(14)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.5-6.0	-	A-6(8)	-	-	-	-	-	-	-	-	-

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Boring	Project	Sample	Station	Offset	Ground	Sample	Soil	Description	Blow	RQD	Grain	Size	Distribution		LL	PL	PI
No.		No.	No.	Ft.	Elevation	Depth	Texture	AASHTO	per	%	Gravel	Sand	Silt	Clay			
					Ft.	Ft.			Ft.								
357	-	-	620+00	CL	1212.7	0.0-0.7	Topsoil	A-4(8)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.7-3.0	-	A-6(9)	-	-	-	-	-	-	-	-	-
358	-	-	621+50	CL	1208.7	0.0-1.3	Topsoil	A-4(8)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.3-3.8	-	A-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.8-5.3	-	A-4(5)	-	-	-	-	-	-	-	-	-
359	-	-	625+00	CL	1213.7	0.0-0.7	Topsoil	A-4(8)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.7-3.0	-	A-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.0-4.0	-	A-4(5)	-	-	-	-	-	-	-	-	-
360	-	-	628+00	CL	1213.2	0.0-0.5	Topsoil	A-4(8)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.5-2.5	-	A-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	2.5-3.8	-	A-4(5)	-	-	-	-	-	-	-	-	-

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
361	-	-	632+00	CL	1212.1	0.0-0.4	Topsoil	A-4(8)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.4-1.5	-	A-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.5-4.2	-	A-4(5)	-	-	-	-	-	-	-	-	-
362	-	-	634+00	CL	1206.1	0.0-1.3	Topsoil	A-4(8)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.3-3.6	-	A-6(9)	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.6-5.2	-	A-4(5)	-	-	-	-	-	-	-	-	-

Borehold Data for U. S. 40 From Richmond East to the Ohio State Line

Appendix A 16

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	Soil Description AASHTO	Blow per Ft.	ROD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
363	-	-	68+50	10RT	1096.2	0.0-1.0	Silty clay	-	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.0-6.0	Sandy clay loam	A-4	-	-	8	44	27	15	23	15	8
364	-	-	75+00	CL	116.9	0.0-0.5	Silty clay	-	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	0.5-5.0	Sandy loam	A-4	-	-	14	46	25	10	17	14	3
	-	-	"	"	"	5.0-5.3	Sand	-	-	-	-	-	-	-	-	-	-
365	-	-	80+00	CL	1125.5	0.0-3.0	Fill	-	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	3.0-4.5	Sandy clay loam	A-4	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	4.5-6.0	Loam	"	-	-	-	-	-	-	-	-	-
366	-	-	89+00	24LT	1131.2	0.0-11.0	Sandy clay loam	A-4	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	11.0-13.0	Sandy loam	"	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	13.0-15.0	Sandy clay loam	"	-	-	-	-	-	-	-	-	-

Apendix A16

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description Texture	AASHTO	Blow per Ft.	RQD %	Grain Size Distribution Gravel	Sand	Silt	Clay	LL	PL	PI
367	-	-	94+10	CL	1116.0	0.0-1.5	Silty clay	-	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.5-8.8	Sandy clay	A-4	-	-	-	-	-	-	-	-	-
368	-	-	116+00	CL	1055.9	0.0-3.5	Gravel	A-3	-	-	88	8	2	1	20	NP	NP
	-	-	"	"	"	3.5-7.5	Sand	"	-	-	21	72	5	1	18	NP	NP
	-	-	"	"	"	-	Gravel	"	-	-	-	-	-	-	-	-	-
369	-	-	123+00	SLT	1052.8	0.0-1.0	Gravel	A-3	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	1.0-4.5	Sand	"	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	4.5-6.5	Gravel & sand	"	-	-	60	37	2	1	16	NP	NP
370	-	-	135+00	CL	1081.1	0.0-3.0	Clay loam	A-4-7	-	-	3	45	24	14	34	17	17
	-	-	"	"	"	3.0-5.0	Gravel	A-3	-	-	-	-	-	-	-	-	-
	-	-	"	"	"	5.0-8.5	Sand & Gravel	"	-	-	-	-	-	-	-	-	-

Boring No.	Project	Sample No.	Station No.	Offset Ft.	Ground Elevation Ft.	Sample Depth Ft.	Soil Description		Blow per Ft.	RQD %	Grain Size Distribution				LL	PL	PI
							Texture	AASHTO			Gravel	Sand	Silt	Clay			
371	-	-	154+00	10LT	1152.2	0.0-5.0	Sandy Clay Loam	A-4	-	-	9	41	28	13	22	14	8
	-	-	"	"	"	5.0-17.5	"	"	-	-	-	-	-	-	-	-	-

APPENDIX B

PHYSICAL AND CHEMICAL PROPERTIES OF AGRICULTURAL SOILS IN WAYNE COUNTY (1)

APPENDIX B. PHYSICAL AND CHEMICAL PROPERTIES OF AGRICULTURAL SOILS IN WAYNE COUNTY (1)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodi-bility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
CeB2--------------	0-17	14-26	1.30-1.50	0.6-2.0	0.20-0.24	5.6-7.3	Low-----------	0.37	5	6	1-3
Celina	17-37	35-48	1.45-1.70	0.2-0.6	0.16-0.19	4.5-7.8	Moderate-----	0.37			
	37-60	16-27	1.60-1.82	0.2-0.6	0.06-0.10	7.4-8.4	Low-----------	0.37			
CrA---------------	0-13	11-24	1.35-1.45	0.6-2.0	0.20-0.24	5.1-6.5	Low-----------	0.43	3	5	1-3
Crosby	13-23	35-45	1.50-1.70	0.06-0.2	0.15-0.20	5.1-7.3	Moderate-----	0.43			
	23-60	15-27	1.70-2.00	0.06-0.6	0.05-0.17	7.4-8.4	Low-----------	0.43			
CtA---------------	0-9	15-24	1.40-1.55	0.6-2.0	0.19-0.22	5.1-7.3	Low-----------	0.37	3	5	1-3
Crosby	9-13	35-40	1.45-1.60	0.06-0.2	0.16-0.17	5.1-7.3	Moderate-----	0.37			
	13-22	25-40	1.50-1.70	0.06-0.2	0.10-0.16	5.1-7.3	Moderate-----	0.37			
	22-60	15-27	1.70-2.00	0.06-0.2	0.05-0.15	7.4-8.4	Low-----------	0.37			
EdF---------------	0-4	27-40	1.45-1.65	0.06-0.6	0.11-0.17	4.5-8.4	Moderate-----	0.17	3	8	.5-3
Eden	4-36	40-60	1.45-1.65	0.06-0.2	0.08-0.13	5.1-8.4	Moderate-----	0.28			
	36	---	---	---	---	---	-------------	----			
EoA, EoB2, EoC2,											
EoD2-------------	0-13	15-25	1.30-1.50	0.6-2.0	0.18-0.22	5.6-7.3	Low-----------	0.37	4	5	1-3
Eldean	13-29	35-48	1.40-1.60	0.2-2.0	0.08-0.14	5.6-7.8	Moderate-----	0.37			
	29-34	25-45	1.30-1.60	0.6-2.0	0.07-0.14	6.6-8.4	Low-----------	0.37			
	34-60	2-8	1.55-1.70	>6.0	0.01-0.04	7.4-8.4	Low-----------	0.10			
ExB3, ExC3--------	0-10	27-33	1.35-1.55	0.6-2.0	0.16-0.18	5.6-7.3	Low-----------	0.37	3	6	.5-2
Eldean	10-23	35-48	1.40-1.60	0.2-2.0	0.08-0.14	5.6-7.8	Moderate-----	0.37			
	23-60	2-8	1.55-1.70	>6.0	0.01-0.04	7.4-8.4	Low-----------	0.10			
FcA---------------	0-14	11-22	1.40-1.55	0.6-2.0	0.22-0.24	5.1-7.3	Low-----------	0.37	5	5	1-3
Fincastle	14-32	23-35	1.45-1.65	0.6-2.0	0.18-0.20	4.5-6.5	Moderate-----	0.37			
	32-56	24-32	1.45-1.65	0.6-2.0	0.15-0.19	5.1-7.8	Moderate-----	0.37			
	56-60	20-26	1.55-1.90	0.2-0.6	0.05-0.19	7.4-8.4	Low-----------	0.37			
Ge----------------	0-12	18-27	1.30-1.50	0.6-2.0	0.20-0.24	6.1-7.8	Low-----------	0.37	5	5	1-3
Genesee	12-60	18-27	1.30-1.50	0.6-2.0	0.17-0.22	6.1-8.4	Low-----------	0.37			
Hb*.											
Haplaquepts											
HeF---------------	0-7	20-30	1.20-1.40	0.6-2.0	0.18-0.24	6.1-7.8	Low-----------	0.32	4	5	1-3
Hennepin	7-15	18-30	1.30-1.60	0.2-2.0	0.14-0.22	6.1-7.8	Low-----------	0.32			
	15-60	18-30	1.45-1.70	0.06-0.6	0.07-0.11	6.1-8.4	Low-----------	0.32			
Hu----------------	0-60	---	0.15-0.45	0.2-6.0	0.35-0.45	5.6-7.8	-------------	----	2	2	>70
Houghton											
LbB2, LbC2, LbD2-	0-7	18-27	1.30-1.55	0.6-2.0	0.20-0.24	5.6-7.3	Low-----------	0.37	3	6	1-3
Losantville	7-16	35-45	1.40-1.70	0.2-2.0	0.09-0.19	6.1-7.8	Moderate-----	0.37			
	16-60	12-24	1.50-1.80	0.06-0.2	0.05-0.19	7.4-8.4	Low-----------	0.37			
LcC3, LcD3--------	0-7	27-35	1.30-1.60	0.2-0.6	0.17-0.19	5.6-7.3	Moderate-----	0.37	2	6	.5-2
Losantville	7-16	35-45	1.40-1.70	0.2-2.0	0.09-0.19	6.1-7.8	Moderate-----	0.37			
	16-60	12-24	1.50-1.80	0.06-0.2	0.05-0.19	7.4-8.4	Low-----------	0.37			
LeB2--------------	0-7	18-27	1.30-1.55	0.6-2.0	0.20-0.24	5.6-7.3	Low-----------	0.37	3	6	1-3
Losantville	7-18	35-45	1.40-1.70	0.2-2.0	0.09-0.19	6.1-7.8	Moderate-----	0.37			
	18-60	12-24	1.50-1.80	0.06-0.2	0.05-0.19	7.4-8.4	Low-----------	0.37			

APPENDIX B (CONTINUED)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
LxC3---------------	0-7	27-35	1.30-1.60	0.2-0.6	0.17-0.19	5.6-7.3	Moderate-----	0.37	2	6	.5-2
Losantville	7-17	35-45	1.40-1.70	0.2-2.0	0.09-0.19	6.1-7.8	Moderate-----	0.37			
	17-60	12-24	1.50-1.80	0.06-0.2	0.05-0.19	7.4-8.4	Low----------	0.37			
Ma----------------	0-10	17-27	1.30-1.45	0.2-0.6	0.22-0.24	6.6-7.3	Low----------	0.28	5	6	3-5
Mahalasville	10-42	27-35	1.40-1.60	0.06-0.2	0.18-0.20	6.6-7.3	Moderate-----	0.28			
	42-47	8-25	1.40-1.60	0.06-0.2	0.17-0.19	7.4-7.8	Low----------	0.28			
	47-60	3-18	1.50-1.70	2.0-6.0	0.19-0.21	7.9-8.4	Low----------	0.28			
MnB2, MnC2, MnD2,											
MnE, MnF---------	0-6	11-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.37	5	5	.5-3
Miami	6-20	25-35	1.45-1.65	0.6-2.0	0.15-0.20	5.1-6.0	Moderate-----	0.37			
	20-60	15-25	1.55-1.90	0.2-0.6	0.05-0.19	6.6-8.4	Moderate-----	0.37			
MrA, MrB2, MrC2--	0-8	18-25	1.30-1.45	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.37	5	6	1-3
Miami	8-36	27-35	1.35-1.45	0.6-2.0	0.18-0.21	5.6-6.5	Moderate-----	0.37			
	36-60	18-27	1.40-1.60	0.6-2.0	0.16-0.20	7.4-7.8	Low----------	0.37			
Ms----------------	0-10	27-32	1.30-1.50	0.6-2.0	0.19-0.22	6.1-7.3	Moderate-----	0.32	4	6	4-7
Millsdale	10-28	35-45	1.40-1.70	0.2-0.6	0.12-0.16	6.1-8.4	High---------	0.32			
	28	---	---	---	---	---	-------------	----			
OcA, OcB2---------	0-8	11-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-6.5	Low----------	0.37	5	5	.5-3
Ockley	8-35	20-35	1.45-1.60	0.6-2.0	0.15-0.22	4.5-6.0	Moderate-----	0.37			
	35-48	20-35	1.40-1.55	0.6-2.0	0.06-0.11	5.6-6.5	Moderate-----	0.24			
	48-60	2-5	1.60-1.80	>20	0.02-0.04	7.4-8.4	Low----------	0.10			
Or*.											
Orthents											
Pr*.											
Pits											
Rc----------------	0-11	28-30	1.40-1.60	0.6-2.0	0.21-0.23	6.1-7.3	Moderate-----	0.28	5	7	4-6
Ragsdale	11-48	20-30	1.50-1.70	0.6-2.0	0.18-0.20	6.1-7.3	Moderate-----	0.28			
	48-70	10-20	1.50-1.70	0.6-2.0	0.20-0.22	7.4-8.4	Low----------	0.28			
RbA---------------	0-14	16-27	1.30-1.45	0.6-2.0	0.17-0.22	5.1-7.3	Low----------	0.37	3	6	1-3
Randolph	14-28	35-50	1.40-1.70	0.2-0.6	0.13-0.16	5.1-7.8	Moderate-----	0.37			
	28-39	18-36	1.50-1.70	0.2-0.6	0.04-0.11	7.4-8.4	Low----------	0.37			
	39	---	---	---	---	---	-------------	----			
RkA---------------	0-12	12-20	1.20-1.45	0.6-2.0	0.17-0.24	5.1-7.3	Low----------	0.37	5	5	2-4
Reesville	12-34	27-35	1.30-1.55	0.6-2.0	0.17-0.22	5.1-7.8	Moderate-----	0.37			
	34-48	20-25	1.30-1.60	0.6-2.0	0.15-0.20	7.4-8.4	Low----------	0.37			
	48-60	12-25	1.45-1.70	0.2-0.6	0.15-0.18	7.4-8.4	Low----------	0.37			
RmD, RmF----------	0-6	8-25	1.20-1.50	2.0-6.0	0.10-0.12	6.6-7.8	Low----------	0.20	3	8	4-6
Rodman	6-12	5-25	1.10-1.50	2.0-6.0	0.09-0.12	6.6-7.8	Low----------	0.20			
	12-60	0-10	1.80-2.00	>20	0.02-0.04	7.4-8.4	Low----------	0.10			
RsB2, RsC3--------	0-6	11-25	1.30-1.45	0.6-3.0	0.21-0.24	5.1-7.3	Low----------	0.37	5	5	.5-3
Russell	6-30	25-33	1.40-1.60	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.37			
	30-66	23-33	1.40-1.60	0.6-2.0	0.15-0.19	5.1-7.3	Moderate-----	0.37			
	66-80	14-27	1.60-1.80	0.6-2.0	0.05-0.19	7.4-8.4	Low----------	0.37			
Sb----------------	0-3	18-27	1.30-1.50	0.6-2.0	0.22-0.24	6.1-7.8	Low----------	0.37	5	5	2-5
Shoals	3-60	18-33	1.35-1.55	0.6-2.0	0.17-0.22	6.1-7.8	Low----------	0.37			
Sk----------------	0-16	11-22	1.30-1.45	0.6-2.0	0.20-0.24	6.6-7.3	Low----------	0.32	5	5	.5-3
Sleeth	16-46	20-35	1.45-1.60	0.6-2.0	0.15-0.19	5.6-6.5	Moderate-----	0.32			
	46-60	2-5	1.60-1.80	>20	0.02-0.04	7.9-8.4	Low----------	0.10			

APPENDIX B (CONTINUED)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH					Pct
So---------------- Sloan	0-10	27-33	1.25-1.50	0.6-2.0	0.18-0.22	6.1-7.8	Moderate-----	0.37	5	6	3-6
	10-40	22-35	1.25-1.55	0.2-2.0	0.15-0.19	6.1-8.4	Moderate-----	0.37			
	40-60	10-30	1.20-1.50	0.2-2.0	0.13-0.18	6.6-8.4	Low----------	0.37			
St---------------- Stonelick	0-9	10-22	1.20-1.45	0.6-2.0	0.15-0.20	7.4-8.4	Low----------	0.24	5	5	1-3
	9-60	5-18	1.20-1.55	2.0-6.0	0.05-0.11	7.4-8.4	Low----------	0.24			
SuB3, SuC3, SuD3- Strawn	0-7	27-30	1.35-1.55	0.6-2.0	0.15-0.20	5.6-6.5	Moderate-----	0.37	3	7	1-2
	7-14	27-35	1.35-1.55	0.6-2.0	0.15-0.20	5.6-7.8	Moderate-----	0.37			
	14-60	22-30	1.50-1.70	0.2-0.6	0.08-0.12	7.4-8.4	Low----------	0.37			
Tr---------------- Treaty	0-16	28-35	1.40-1.60	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	7	4-6
	16-38	28-35	1.50-1.70	0.6-2.0	0.18-0.20	6.1-7.8	Moderate-----	0.43			
	38-42	20-35	1.50-1.70	0.6-2.0	0.15-0.19	6.6-7.8	Moderate-----	0.43			
	42-60	15-27	1.70-1.90	0.2-0.6	0.17-0.19	7.4-8.4	Low----------	0.43			
Ts---------------- Treaty	0-18	28-35	1.40-1.60	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	7	4-6
	18-31	28-35	1.50-1.70	0.6-2.0	0.18-0.20	6.1-7.8	Moderate-----	0.43			
	31-65	20-35	1.50-1.70	0.6-2.0	0.15-0.19	6.6-7.8	Moderate-----	0.43			
	65-80	15-27	1.70-1.90	0.2-0.6	0.17-0.19	7.4-8.4	Low----------	0.43			
UmB*, UmC*: Urban land.											
Miami------------	0-6	11-22	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.37	5	5	.5-3
	6-20	25-35	1.45-1.65	0.6-2.0	0.15-0.20	5.1-6.0	Moderate-----	0.37			
	20-60	15-25	1.55-1.90	0.2-0.6	0.05-0.19	6.6-8.4	Moderate-----	0.37			
UoA*, UoB*: Urban land.											
Miami------------	0-8	20-27	1.30-1.45	0.6-2.0	0.19-0.21	5.6-7.3	Moderate-----	0.37	5	5	.5-3
	8-36	27-35	1.45-1.60	0.6-2.0	0.15-0.19	5.6-7.8	Moderate-----	0.37			
	36-60	15-26	1.45-1.60	0.6-2.0	0.17-0.19	7.4-8.4	Low----------	0.37			
Us*: Urban land.											
Millsdale--------	0-10	27-32	1.30-1.50	0.6-2.0	0.19-0.22	6.1-7.3	Moderate-----	0.32	4	6	4-7
	10-28	35-45	1.40-1.70	0.2-0.6	0.12-0.16	6.1-8.4	High---------	0.32			
	28	---	---	---	---	---	-------------	----			
We---------------- Westland	0-16	27-35	1.35-1.50	0.6-2.0	0.22-0.24	5.6-7.3	Moderate-----	0.28	5	7	2-6
	16-37	27-35	1.45-1.60	0.6-2.0	0.15-0.19	5.6-7.3	Moderate-----	0.28			
	37-47	15-30	1.40-1.60	0.6-2.0	0.14-0.16	5.6-7.3	Moderate-----	0.28			
	47-60	1-7	1.50-1.75	>20	0.02-0.04	7.4-8.4	Low----------	0.10			
WyB2, WyC2, WyD2- Wynn	0-12	17-27	1.30-1.50	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	4	5	1-3
	12-16	30-40	1.35-1.55	0.2-0.6	0.15-0.20	5.1-7.3	Moderate-----	0.37			
	16-34	35-55	1.45-1.75	0.06-0.6	0.08-0.12	6.6-8.4	High---------	0.37			
	34	---	---	---	---	---	-------------	----			
XeB2-------------- Xenia	0-9	11-22	1.40-1.55	0.6-2.0	0.22-0.24	6.6-7.3	Low----------	0.37	5	5	1-3
	9-38	27-35	1.45-1.65	0.2-0.6	0.18-0.20	5.1-6.0	Moderate-----	0.37			
	38-60	20-27	1.55-1.90	0.2-2.0	0.05-0.19	7.9-8.4	Low----------	0.37			

APPENDIX C

ENGINEERING INDEX PROPERTIES OF AGRICULTURAL SOILS IN WAYNE COUNTY (1)

APPENDIX C. ENGINEERING INDEX PROPERTIES OF AGRICULTURAL SOILS IN WAYNE COUNTY (1)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
CeB2--------------- Celina	0-17	Silt loam---------	ML	A-4	0	100	90-100	90-100	70-85	26-40	3-10
	17-37	Clay, clay loam, silty clay loam.	CL	A-6, A-7	0	100	90-100	80-95	70-85	32-48	12-28
	37-60	Loam, silt loam, clay loam.	CL, CL-ML	A-4, A-6	0	75-95	75-90	65-90	50-80	20-36	4-16
CrA--------------- Crosby	0-13	Silt loam---------	CL, CL-ML, ML	A-4, A-6	0	100	95-100	80-100	50-90	15-30	4-15
	13-23	Clay loam, silty clay loam.	CL	A-6, A-7	0-3	90-100	85-100	75-95	65-95	35-50	15-25
	23-60	Loam--------------	CL, ML, CL-ML	A-4, A-6	0-3	85-100	80-95	75-90	50-65	15-30	4-14
CtA--------------- Crosby	0-9	Silt loam---------	CL-ML, CL	A-4, A-6	0	100	95-100	85-100	65-90	20-35	5-15
	9-13	Silty clay loam	CL	A-6, A-7	0	100	95-100	90-100	80-95	35-45	15-20
	13-22	Clay loam, loam	CL	A-6, A-7	0-10	85-95	80-95	65-95	50-80	30-45	10-20
	22-60	Loam--------------	CL-ML, CL	A-4, A-6	0-10	85-95	80-90	65-90	50-70	20-35	5-15
EdF--------------- Eden	0-4	Flaggy silty clay loam.	CL, CH	A-7, A-6	25-40	75-95	70-95	70-95	65-95	35-65	12-35
	4-36	Flaggy silty clay, flaggy clay, silty clay.	CH, CL	A-7	10-45	75-100	55-100	50-100	50-95	45-75	20-45
	36	Weathered bedrock	---	---	---	---	---	---	---	---	---
EoA, EoB2, EoC2, EoD2------------- Eldean	0-13	Loam--------------	ML, CL-ML, CL	A-4, A-6	0	85-100	80-100	70-100	55-90	20-40	4-14
	13-29	Clay, sandy clay, gravelly clay loam.	CL, ML	A-7, A-6	0-5	75-100	60-100	55-95	50-80	38-50	12-23
	29-34	Gravelly clay loam, loam, gravelly sandy loam.	CL, GC, SC	A-4, A-6, A-7, A-2	0-10	55-85	45-85	45-75	30-60	30-45	8-20
	34-60	Stratified sand to gravel.	GM, SM, GP-GM, SP-SM	A-1, A-2	0-15	30-70	20-50	5-40	0-35	---	NP
ExB3, ExC3-------- Eldean	0-10	Clay loam---------	CL	A-6, A-4	0-5	85-100	75-100	65-100	55-80	25-40	9-18
	10-23	Clay, sandy clay, gravelly clay loam.	CL, ML	A-7, A-6	0-5	75-100	60-100	55-95	50-80	38-50	12-23
	23-60	Stratified sand to gravel.	GM, SM, GP-GM, SP-SM	A-1, A-2	0-15	30-70	20-50	5-40	0-35	---	NP
FcA--------------- Fincastle	0-14	Silt loam---------	CL, ML, CL-ML	A-4	0	100	95-100	90-100	75-93	<25	3-10
	14-32	Silty clay loam, silt loam.	CL	A-6	0	100	100	95-100	85-95	30-40	10-15
	32-56	Clay loam, loam, silty clay loam.	CL	A-6	0	95-100	90-98	85-95	75-85	30-40	10-15
	56-60	Loam--------------	CL	A-4, A-6	0-3	88-96	82-90	70-86	50-66	25-30	8-11
Ge---------------- Genesee	0-12	Silt loam---------	ML, CL	A-4, A-6	0	100	100	90-100	75-90	26-40	3-15
	12-60	Silt loam, loam	ML, CL	A-4, A-6	0	100	100	90-100	75-90	26-40	3-15
Hb*. Haplaquepts											

APPENDIX C (CONTINUED)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
HeF---------------- Hennepin	0-7	Loam----------------	CL, CL-ML	A-4, A-6	0-5	90-100	85-100	70-100	60-95	25-40	5-20
	7-15	Loam, sandy loam, silt loam.	SC, SM-SC, CL, CL-ML	A-4, A-6, A-7	0-5	85-100	80-100	65-100	35-95	20-50	5-25
	15-60	Loam, sandy loam, clay loam.	SC, SM-SC, CL, CL-ML	A-4, A-6, A-7	0-5	85-100	80-100	65-100	35-95	20-50	5-25
Hu---------------- Houghton	0-60	Sapric material	PT	A-8	0	---	---	---	---	---	---
LbB2, LbC2, LbD2- Losantville	0-7	Silt loam----------	CL, CL-ML	A-4, A-6	0-2	95-100	90-100	80-100	65-90	20-30	5-12
	7-16	Clay, clay loam	CL	A-7, A-6	0-2	90-100	85-100	75-95	60-90	35-50	15-25
	16-60	Loam----------------	CL, CL-ML	A-4	0-5	85-95	80-95	65-85	50-70	20-30	5-10
LcC3, LcD3-------- Losantville	0-7	Clay loam----------	CL	A-6	0-2	95-100	90-100	80-100	65-80	30-40	11-20
	7-16	Clay, clay loam	CL	A-7, A-6	0-2	90-100	85-100	75-95	60-90	35-50	15-25
	16-60	Loam----------------	CL, CL-ML	A-4	0-5	85-95	80-95	65-85	50-70	20-30	5-10
LeB2---------------- Losantville	0-7	Loam----------------	CL, CL-ML	A-4, A-6	0-2	95-100	90-100	80-100	65-90	20-30	5-12
	7-18	Clay, clay loam	CL	A-7, A-6	0-2	90-100	85-100	75-95	60-90	35-50	15-25
	18-60	Loam----------------	CL, CL-ML	A-4	0-5	85-95	80-95	65-85	50-70	20-30	5-10
LxC3---------------- Losantville	0-7	Clay loam----------	CL	A-6	0-2	95-100	90-100	80-100	65-80	30-40	11-20
	7-17	Clay, clay loam	CL	A-7, A-6	0-2	90-100	85-100	75-95	60-90	35-50	15-25
	17-60	Loam----------------	CL, CL-ML	A-4	0-5	85-95	80-95	65-85	50-70	20-30	5-10
Ma---------------- Mahalasville	0-10	Silt loam----------	CL, ML	A-4, A-6	0	100	100	90-100	70-90	27-36	4-12
	10-42	Silty clay loam	CL, CH	A-6, A-7	0	100	100	95-100	85-95	38-54	20-32
	42-47	Loam, silt loam	ML, CL-ML, CL	A-6, A-4	0	95-100	90-95	85-95	60-90	22-35	3-15
	47-60	Stratified silt to sand.	CL, SC, SP-SC, CL-ML	A-4, A-2-4	0	75-90	70-80	50-80	10-60	15-30	NP-10
MnB2, MnC2, MnD2, MnE, MnF-------- Miami	0-6	Silt loam----------	CL, CL-ML, ML	A-4	0	100	95-100	80-100	50-90	15-30	3-10
	6-20	Clay loam, silty clay loam, sandy clay loam.	CL, SC	A-6	0	90-100	85-100	70-95	40-95	30-40	15-25
	20-60	Loam----------------	CL, CL-ML, SC, SM-SC	A-4, A-6	0-3	85-100	85-100	70-90	45-70	20-40	5-20
MrA, MrB2, MrC2-- Miami	0-8	Silt loam----------	CL-ML, CL	A-4, A-6	0	100	95-100	85-100	70-90	20-30	6-15
	8-36	Silty clay loam, clay loam.	CL	A-6	0	100	90-100	80-100	65-95	30-40	10-20
	36-60	Loam, silt loam	CL-ML, CL	A-4, A-6	0	100	90-100	75-100	55-85	20-35	5-15
Ms---------------- Millsdale	0-10	Silty clay loam	CL	A-6, A-7	0	90-100	80-100	75-100	60-95	32-50	12-25
	10-28	Clay, silty clay loam, clay loam.	CH, CL	A-7	0-5	85-100	55-100	45-100	40-95	40-60	20-35
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
OcA, OcB2--------- Ockley	0-8	Silt loam----------	CL, ML, CL-ML	A-4	0	95-100	85-100	70-100	50-90	15-30	3-10
	8-35	Silty clay loam, clay loam, silt loam.	CL	A-6, A-4	0	90-100	80-100	70-90	55-90	25-40	8-15
	35-48	Gravelly clay loam, gravelly sandy clay loam.	CL, SC	A-6, A-4, A-2	0-2	70-85	45-85	40-70	25-55	25-40	8-15
	48-60	Stratified sand to gravelly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	1-5	30-70	20-55	10-40	2-10	---	NP

APPENDIX C (CONTINUED)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Or*. Orthents											
Pr*. Pits											
Rc---------------- Ragsdale	0-11	Silty clay loam	CL	A-6	0	100	100	90-100	80-100	30-35	10-15
	11-48	Silty clay loam, silt loam.	CL	A-6, A-4	0	100	100	90-100	80-95	25-35	8-13
	48-70	Silt loam---------	CL-ML, ML, CL	A-4	0	100	100	90-100	70-90	<25	3-8
RhA--------------- Randolph	0-14	Silt loam---------	CL-ML, CL	A-4, A-6	0	95-100	95-100	90-100	75-85	20-38	4-15
	14-28	Clay, silty clay, clay loam.	CL, CH	A-7, A-6	0-5	75-95	75-95	75-85	70-80	35-60	14-32
	28-39	Very gravelly clay loam, gravelly sandy clay loam, sandy loam.	GC, SM-SC, SC, GM-GC	A-2, A-1, A-4, A-6	0-15	30-70	20-60	15-55	10-50	20-30	5-15
	39	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
RkA--------------- Reesville	0-12	Silt loam---------	ML, CL-ML	A-4	0	100	90-100	90-100	85-100	25-35	4-10
	12-34	Silty clay loam	CL, CL-ML	A-6, A-7, A-4	0	100	90-100	90-100	90-100	20-50	4-28
	34-48	Silt loam---------	CL, CL-ML	A-4, A-6	0	100	90-100	85-100	80-90	20-40	4-20
	48-60	Loam, silt loam	ML, CL, CL-ML	A-4, A-6	0	90-100	85-95	80-90	70-90	20-40	3-18
RmD, RmF---------- Rodman	0-6	Gravelly loam----	ML, CL, SM, SC	A-4	0-2	70-85	65-85	60-80	36-65	<30	3-9
	6-12	Gravelly loam, sandy loam, loam.	ML, CL, SC, SM	A-4, A-2, A-1	0-2	70-85	60-85	40-75	20-55	<30	NP-10
	12-60	Stratified sand to gravelly coarse sand.	SP, SP-SM, GP, GP-GM	A-1	1-5	30-70	22-50	7-20	2-10	---	NP
RsB2, RsC2-------- Russell	0-6	Silt loam---------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-90	20-35	5-15
	6-30	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	85-95	35-45	15-25
	30-66	Clay loam, loam, silty clay loam.	CL	A-6, A-7	0	95-100	90-95	80-90	60-80	35-45	15-25
	66-80	Loam--------------	CL, CL-ML	A-4, A-6	0-3	85-95	80-90	75-85	50-65	20-30	5-12
Sb---------------- Shoals	0-3	Silt loam---------	CL, CL-ML	A-4, A-6	0	100	100	90-100	65-90	20-35	6-15
	3-60	Silt loam, loam, clay loam.	CL, CL-ML	A-4, A-6	0	100	100	90-100	75-85	25-40	5-15
Sk---------------- Sleeth	0-16	Silt loam---------	CL, ML, CL-ML	A-4, A-6	0	100	90-100	75-95	50-85	20-35	3-15
	16-46	Clay loam, silty clay loam, sandy clay loam.	CL	A-6	0	85-95	85-95	80-90	65-75	30-40	15-25
	46-60	Stratified sand to gravelly sand.	SP, GP, SP-SM, GP-GM	A-1	1-5	30-70	22-55	7-20	2-10	---	NP

APPENDIX C (CONTINUED)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
Sn----------------- Sloan	0-10	Silty clay loam	CL	A-6, A-7	0	100	95-100	85-100	70-95	35-45	12-20
	10-40	Silty clay loam, clay loam, silt loam.	CL, ML	A-6, A-7, A-4	0	100	90-100	85-100	75-95	30-45	8-18
	40-60	Stratified gravelly sandy loam to silty clay loam.	ML, CL	A-4, A-6	0	95-100	70-100	60-95	50-90	25-40	3-15
St----------------- Stonelick	0-9	Loam--------------	ML, CL, SM, CL-ML	A-4	0	85-100	70-100	60-95	45-90	20-32	2-10
	9-60	Stratified loam to gravelly loamy sand.	SM, SP-SM, GM	A-2, A-4, A-3, A-1-b	0	85-100	55-95	40-60	5-40	<15	NP
SuB3, SuC3, SuD3- Strawn	0-7	Clay loam---------	CL	A-6, A-7	0-5	90-100	80-100	75-95	50-95	25-45	10-23
	7-14	Silty clay loam, clay loam.	CL	A-6, A-7	0-5	90-100	80-100	75-95	50-95	25-45	10-23
	14-60	Loam, silt loam, clay loam.	CL, SC	A-4, A-6	0-5	75-100	70-100	60-95	40-95	20-35	7-18
Tr----------------- Treaty	0-16	Silty clay loam	CL	A-6	0	100	100	95-100	85-95	30-40	10-15
	16-38	Silty clay loam	CL	A-6	0	100	100	95-100	85-95	30-40	10-15
	38-42	Clay loam, silty clay loam, loam.	CL, CL-ML	A-6, A-4	0	95-100	90-100	75-95	55-85	25-40	5-15
	42-60	Loam, silt loam	CL-ML, CL	A-4, A-6	0	90-100	90-95	75-90	55-75	20-30	5-15
Ts----------------- Treaty	0-18	Silty clay loam	CL	A-6	0	100	100	95-100	85-95	30-40	10-25
	18-31	Silty clay loam	CL	A-6	0	100	100	95-100	85-95	30-40	10-15
	31-65	Clay loam, silty clay loam, loam.	CL, CL-ML	A-6, A-4	0	95-100	90-100	75-95	55-85	25-40	5-15
	65-80	Loam, silt loam	CL-ML, CL	A-4, A-6	0	90-100	90-95	75-90	55-75	20-30	5-15
UmB*, UmC*: Urban land.											
Miami------------	0-6	Silt loam---------	CL, CL-ML, ML	A-4	0	100	95-100	80-100	50-90	15-30	3-10
	6-20	Clay loam, silty clay loam, sandy clay loam.	CL, SC	A-6	0	90-100	85-100	70-95	40-95	30-40	15-25
	20-60	Loam--------------	CL, CL-ML, SC, SM-SC	A-4, A-6	0-3	85-100	85-100	70-90	45-70	20-40	5-20
UoA*, UoB*: Urban land.											
Miami------------	0-8	Silt loam---------	CL	A-4, A-6	0-2	95-100	90-100	76-95	55-75	25-35	8-15
	8-36	Clay loam---------	CL	A-6, A-7	0-5	90-100	90-95	80-95	60-76	30-45	10-20
	36-60	Loam--------------	CL, CL-ML	A-4, A-6	0-5	90-100	90-95	76-90	55-75	20-30	5-15
Us*: Urban land.											
Millsdale--------	0-10	Silty clay loam	CL	A-6, A-7	0	90-100	80-100	75-100	60-95	32-50	12-25
	10-28	Clay, silty clay loam, clay loam.	CH, CL	A-7	0-5	85-100	80-100	75-100	60-95	40-60	20-35
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

APPENDIX C (CONTINUED)

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve [illegible]				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
We----------------- Westland	0-16	Silty clay loam	CL	A-6, A-7	0	100	95-100	90-100	75-90	30-45	10-25
	16-37	Clay loam, silty clay loam.	CL	A-6, A-7	0	95-100	90-100	80-100	65-95	35-50	15-30
	37-47	Gravelly clay loam, gravelly sandy loam, loam.	CL	A-6, A-7	0-5	65-75	60-70	55-70	50-70	30-50	15-30
	47-60	Stratified sand to gravelly sand.	SP, GP, SP-SM, GP-GM	A-1	1-5	30-70	22-55	7-20	2-10	---	NP
WyB2, WyC2, WyD2- Wynn	0-12	Silt loam---------	CL-ML, CL	A-4, A-6	0	100	100	85-100	80-90	24-38	5-15
	12-16	Silty clay loam, clay loam.	CL	A-6, A-7	0	100	100	75-100	70-95	30-50	15-30
	16-34	Clay, clay loam, channery clay.	CH, CL, GC	A-7	0-15	90-100	45-95	40-95	35-90	40-60	25-40
	34	Weathered bedrock	---	---	---	---	---	---	---	---	---
XeB2-------------- Xenia	0-9	Silt loam---------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-100	25-35	5-15
	9-38	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	80-95	35-50	15-30
	38-60	Loam---------------	CL, ML, SC, SM	A-4, A-6	0-5	85-95	80-90	75-90	40-65	15-30	NP-[illegible]

APPENDIX D

STATISTICAL STREAM FLOW DATA FOR SELECTED STREAMS IN WAYNE COUNTY (49)

APPENDIX D-1. STATISTICAL STREAM FLOW DATA FOR WHITEWATER RIVER NEAR ECONOMY (49)

03274650 WHITEWATER RIVER NEAR ECONOMY, IN

LOCATION.--Lat 40°00'05", long 85°06'56", in NW¼NE¼ sec.19, T.18 N., R.13 E., Wayne County, Hydrologic Unit 05080003, on right bank 6 ft downstream from bridge on Wayne County Line Road, 1.7 mi upstream from Little Creek, 2.4 mi northwest of Economy, and at mile 91.9.

DRAINAGE AREA.--10.4 mi^2.

PERIOD OF RECORD.--October 1970 to September 1985.

GAGE.--Water-stage recorder. Datum of gage is 1,066.00 ft above National Geodetic Vertical Datum of 1929.

AVERAGE DISCHARGE.--15 years, 11.0 ft^3/s, 14.36 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,100 ft^3/s Aug. 20, 1979, gage height, 8.85 ft; minimum daily, 0.28 ft^3/s Jan. 17, 1977.

DURATION TABLE OF DAILY MEAN DISCHARGES FOR YEAR ENDING SEPTEMBER 30

NUMBER OF DAYS IN CLASS

CLASS / YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1971				18	68	51	30	16	16	23	17	26	14	13	18	9	7	11	5	5	3	4	2	4	1	4		3	1		1				
1972			18	36	10	4	24	15	19	12	11	18	21	32	34	23	15	13	7	11	10	6	11	5	3	4	2		2						
1973							5	11	19	11	17	13	26	27	30	22	17	22	26	20	24	21	14	15	3	3	7	5	2	1	2	2			
1974						13	53	27	28	9	13	21	21	29	29	28	22	13	6	6	8	7	9	5	6	4	4	3	1						
1975				12	9	26	29	22	24	10	8	7	9	14	20	20	31	13	20	17	13	10	12	7	3	2	5	5	1	1	2			1	
1976				10	22	18	10	10	27	44	33	22	19	23	18	21	17	19	7	7	8	7	4	6	3	1	4	2	2		2				
1977		28	19	69	62	47	15	16	14	10	5	14	11	12	10	9	5	3	3	2	2		2	4	1	1				1					
1978								4	13	36	39	51	32	39	22	19	17	17	12	9	8	8	4	3	17	8	2	3	2	2	1	2			
1979							4	8	1	13	13	30	36	41	41	34	31	19	13	10	9	9	8	8	9	10	3	4	2	2	3	3	1		
1980						3	9	8	5	7	21	63	46	27	29	25	15	25	13	16	7	10	9	9	6	1	1	5	3	2	1				
1981				1	16	54	39	12	23	13	20	38	30	18	13	14	12	16	9	8	1	9	6	4	5	1	1	1		1					
1982				4	17	25	49	16	30	19	20	17	11	19	21	15	12	14	10	16	9	12	4	5	4	4	3	4	3	1	1				
1983			3	29	48	14	13	9	17	15	26	33	31	31	20	15	19	6	7	6	6	5	1	5	2	2			2						
1984			3	9	27	13	39	15	17	11	22	24	19	11	19	19	17	30	11	4	9	10	9	12	1	4	4	1			1	1			
1985				3	9	13	24	26	27	13	28	32	24	24	25	25	18	9	7	10	7	9	5	6	6		5	4	2			1	2		1

CLASS	VALUE	TOTAL	ACCUM	PERCT	CLASS	VALUE	TOTAL	ACCUM	PERCT	CLASS	VALUE	TOTAL	ACCUM	PERCT
0	0.00	0	5479	100.00	12	3.3	350	2855	52.11	24	48.0	69	261	4.76
1	0.28	28	5479	100.00	13	4.1	360	2505	45.72	25	60.0	49	192	3.50
2	0.35	43	5451	99.49	14	5.1	349	2145	39.15	26	75.0	41	143	2.61
3	0.44	191	5408	98.70	15	6.4	298	1796	32.78	27	94.0	40	102	1.86
4	0.55	288	5217	95.22	16	8.0	255	1498	27.34	28	120.0	23	62	1.13
5	0.69	283	4929	89.96	17	10.0	230	1243	22.69	29	150.0	11	39	0.71
6	0.86	353	4646	84.80	18	13.0	156	1013	18.49	30	180.0	14	28	0.51
7	1.1	215	4293	78.35	19	16.0	147	857	15.64	31	230.0	9	14	0.26
8	1.3	280	4078	74.43	20	20.0	124	710	12.96	32	290.0	3	5	0.09
9	1.7	246	3798	69.32	21	25.0	127	586	10.70	33	360.0	1	2	0.04
10	2.1	288	3552	64.83	22	31.0	100	459	8.38	34	450.0	1	1	0.02
11	2.6	409	3264	59.57	23	38.0	98	359	6.55					

VALUE EXCEEDED 'P' PERCENT OF TIME

P95 =	0.56
P90 =	0.69
P75 =	1.3
P70 =	1.6
P50 =	3.6
P25 =	9.0
P10 =	26.8

APPENDIX D-1 (CONTINUED)

LOWEST MEAN DISCHARGE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING MARCH 31

YEAR	1	3	7	14	30	60	90	120	183
1972	0.35 2	0.36 2	0.38 2	0.38 2	0.43 2	0.50 2	0.55 2	0.56 2	0.81 2
1973	0.82 12	0.83 12	0.86 12	0.90 12	1.00 12	1.60 12	2.70 12	4.10 12	7.10 13
1974	0.75 11	0.77 11	0.81 11	0.88 11	0.93 11	1.00 10	1.10 9	1.60 9	4.70 11
1975	0.44 5	0.47 5	0.50 5	0.55 5	0.72 7	0.81 7	0.88 7	0.95 7	2.20 7
1976	0.49 6	0.51 6	0.57 8	0.64 8	0.82 9	1.10 11	1.19 10	1.80 11	2.60 8
1977	0.28 1	0.29 1	0.30 1	0.32 1	0.33 1	0.40 1	0.45 1	0.49 1	0.54 1
1978	0.43 4	0.44 4	0.46 4	0.48 4	0.53 4	0.65 5	0.68 4	0.79 3	1.70 5
1979	0.88 13	0.90 13	1.00 13	1.10 13	1.40 13	2.40 13	3.20 13	6.20 13	6.30 12
1980	2.30 14	2.50 14	2.90 14	3.20 14	3.40 14	4.60 14	8.30 14	15.00 14	14.00 14
1981	0.54 9	0.57 9	0.61 9	0.66 9	0.75 8	0.77 6	0.84 6	0.88 5	1.30 3
1982	0.70 10	0.73 10	0.77 10	0.78 10	0.87 10	0.96 9	1.30 11	1.70 10	3.80 10
1983	0.50 7	0.54 8	0.54 6	0.56 6	0.57 5	0.58 4	0.64 3	0.80 4	1.40 4
1984	0.40 3	0.41 3	0.43 3	0.46 3	0.48 3	0.56 3	0.74 5	0.90 6	2.10 6
1985	0.50 8	0.52 7	0.54 7	0.61 7	0.68 6	0.82 8	0.99 8	1.50 8	2.70 9

HIGHEST MEAN DISCHARGE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING SEPTEMBER 30

YEAR	1	3	7	15	30	60	90	120	183
1971	185.00 9	110.00 9	100.00 6	60.00 7	39.00 8	25.00 11	18.00 12	16.00 11	12.00 13
1972	138.00 15	75.00 15	51.00 13	38.00 13	27.00 14	21.00 12	17.00 13	15.00 12	13.00 11
1973	253.00 5	146.00 5	91.00 8	83.00 2	53.00 5	40.00 5	32.00 5	27.00 4	29.00 1
1974	145.00 13	108.00 10	82.00 9	58.00 8	33.00 11	27.00 10	27.00 8	23.00 9	17.00 9
1975	449.00 2	241.00 2	128.00 3	79.00 4	56.00 3	43.00 4	37.00 1	35.00 1	26.00 3
1976	213.00 7	124.00 6	77.00 11	57.00 9	45.00 7	32.00 8	27.00 9	23.00 10	16.00 10
1977	171.00 11	90.00 13	47.00 14	30.00 15	18.00 15	15.00 15	11.00 15	8.70 15	5.90 15
1978	266.00 4	167.00 4	124.00 4	79.00 5	49.00 6	34.00 6	29.00 6	24.00 7	22.00 5
1979	304.00 3	226.00 3	136.00 2	81.00 3	70.00 1	47.00 2	34.00 3	27.00 5	27.00 2
1980	185.00 10	115.00 8	98.00 7	55.00 11	37.00 10	28.00 9	21.00 10	24.00 6	20.00 7
1981	168.00 12	81.00 14	44.00 15	40.00 12	31.00 12	21.00 13	18.00 11	15.00 13	12.00 12
1982	202.00 8	107.00 11	100.00 5	66.00 6	55.00 4	43.00 3	34.00 4	28.00 3	21.00 6
1983	144.00 14	97.00 12	59.00 12	36.00 14	30.00 13	20.00 14	15.00 14	13.00 14	11.00 14
1984	249.00 6	123.00 7	81.00 10	57.00 10	38.00 9	32.00 7	27.00 7	23.00 8	19.00 8
1985	569.00 1	379.00 1	207.00 1	114.00 1	68.00 2	49.00 1	37.00 2	32.00 2	24.00 4

ANNUAL VALUES

ANNUAL MEAN DISCHARGE AND RANKING IN YEAR ENDING MARCH 31

1972	4.90 3
1973	18.00 13
1974	13.00 9
1975	13.00 10
1976	12.00 7
1977	3.30 1
1978	10.00 5
1979	13.00 8
1980	21.00 14
1981	5.40 4
1982	14.00 11
1983	4.80 2
1984	11.00 6
1985	15.00 12

ANNUAL MEAN DISCHARGE AND RANKING IN YEAR ENDING SEPTEMBER 30

1971	6.30 13
1972	8.60 11
1973	19.00 1
1974	9.90 9
1975	14.00 4
1976	9.60 10
1977	3.30 15
1978	14.00 5
1979	19.00 2
1980	13.00 6
1981	7.00 12
1982	11.00 7
1983	6.10 14
1984	11.00 8
1985	14.00 3

APPENDIX D-1 (CONTINUED)

NORMAL MONTHLY MEANS (ALL DAYS)

YEAR	OCT	NOV	DEC	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT
1971	0.78	0.74	2.52	4.76	40.20	11.70	2.96	8.67	3.66	0.89	0.56	0.72
1972	0.56	0.45	12.00	9.25	4.92	14.10	26.90	9.94	9.34	2.43	2.14	10.90
1973	7.85	53.00	28.10	13.80	11.40	41.40	27.10	6.39	22.40	9.35	2.37	1.23
1974	1.03	5.79	9.47	30.90	16.20	18.80	19.90	4.82	7.39	2.47	1.22	0.98
1975	0.76	0.97	11.00	33.00	49.40	30.20	27.00	8.44	7.54	1.97	1.32	1.13
1976	3.29	3.30	15.80	22.80	33.90	17.30	4.31	2.45	6.79	4.21	0.92	0.57
1977	0.58	0.58	0.51	0.33	7.04	11.40	13.60	2.35	1.03	0.57	0.73	0.87
1978	4.86	3.68	39.70	6.56	3.31	41.60	22.70	18.80	4.13	2.86	14.30	4.78
1979	4.86	6.73	15.80	13.40	17.70	32.20	23.10	5.35	9.82	27.50	61.50	6.59
1980	3.41	28.90	20.10	10.70	14.40	34.50	11.50	4.90	21.60	2.98	3.61	1.30
1981	0.77	0.78	1.17	0.85	14.60	2.58	5.20	25.10	15.00	11.80	3.93	2.75
1982	1.72	0.96	3.85	22.80	38.10	27.90	13.70	8.32	4.91	1.67	1.16	0.64
1983	0.57	1.33	8.38	4.88	7.62	4.25	20.20	19.40	3.27	2.37	0.84	0.51
1984	1.05	11.60	19.60	3.06	17.70	31.80	30.80	9.75	2.77	2.42	0.90	0.90
1985	1.98	9.14	20.30	10.80	56.00	33.20	15.50	12.50	5.04	1.36	1.07	0.83

	OCT	NOV	DEC	JAN	FEB	MARCH
TWENTY FIFTH PERCENTILE	0.76	0.78	3.85	4.76	7.62	11.70
FIFTIETH PERCENTILE	1.05	3.30	12.00	10.70	16.19	30.20
SEVENTY FIFTH PERCENTILE	3.41	9.14	20.10	22.80	38.10	34.50

	APRIL	MAY	JUNE	JULY	AUG	SEPT
TWENTY FIFTH PERCENTILE	11.50	4.90	3.66	1.67	0.90	0.72
FIFTIETH PERCENTILE	19.90	8.44	6.79	2.43	1.22	0.98
SEVENTY FIFTH PERCENTILE	26.90	12.50	9.82	4.21	3.61	2.75

APPENDIX D-2. STATISTICAL STREAM FLOW DATA FOR WHITEWATER RIVER NEAR HAGERSTOWN (49)

03274750 WHITEWATER RIVER NEAR HAGERSTOWN, IN

LOCATION.--Lat 39°52'25", long 85°09'47", in NE1/4NE1/4 sec.3, T.16 N., R.12 E., Wayne County, Hydrologic Unit 05080003, on left bank at downstream side of bridge on Jerry Meyers Road, 1.0 mi upstream from Pronghorn Run, 1.5 mi north of Interstate 70, 2.0 mi downstream from Nettle Creek, 2.6 mi south of Hagerstown, and at mile 84.9.

DRAINAGE AREA.--58.7 mi^2.

PERIOD OF RECORD.--October 1970 to September 1985.

GAGE.--Water-stage recorder. Datum of gage is 950.00 ft above National Geodetic Vertical Datum of 1929 (Indiana Flood Control and Water Resources Commission bench mark).

AVERAGE DISCHARGE.--15 years, 68.1 ft^3/s, 15.76 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,300 ft^3/s Jan. 26, 1976, gage height, 10.89 ft; maximum gage height, 11.24 ft Aug. 1, 1979; minimum daily discharge, 5.3 ft^3/s Aug. 5, 1977.

DURATION TABLE OF DAILY MEAN DISCHARGES FOR YEAR ENDING SEPTEMBER 30

CLASS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
YEAR	NUMBER OF DAYS IN CLASS																																		
1971						15	26	56	54	52	37	28	19	24	10	11	5	6	2	2	5	2	1	2		1	2		3	1		1			
1972						2	33	63	24	28	17	22	39	33	22	16	16	14	8	7	6	3	2	3	2	1	1	1	2	1					
1973								6	35	14	13	20	16	31	44	27	34	23	23	15	18	13	8	5	3	1	5	5	2	1	1	2			
1974								34	50	42	21	15	31	17	42	30	22	10	9	10	7	4	3	4	2	7	1	2		1	1				
1975						7	16	37	41	28	16	17	8	14	29	36	22	18	18	12	14	7	5	3	4	1	3	2		1	4		1		1
1976					15	18	15	39	42	35	25	34	29	20	12	16	14	11	7	5	7	5	2	2	4	1	3	1	2	1			1		
1977		9	17	39	45	75	46	27	8	10	12	24	19	7	8	2	4	3	1	2	1			4	1						1				
1978						5	9	11	4	28	55	45	29	26	28	30	13	17	12	8	8	4	7	6	5	4	1	3	1	4		1		1	
1979									1	14	25	27	33	50	48	47	25	13	13	7	11	6	6	4	7	7	4	1	6	2	2	2	4		
1980									9	25	21	45	57	36	40	31	21	18	13	12	7	6	4	4	2	5	2		2	5	1				
1981					12	14	15	42	66	43	28	27	25	16	20	15	11	3	9	4	4	4		3	1	1				2					
1982						1	17	72	25	33	19	27	16	10	31	22	14	12	18	13	8	3	6	3	2	2	2	4	1	2		1	1		
1983			5	17	12	8	42	19	17	26	39	41	37	31	17	15	9	5	6	6		3	2	2	2	1	1		2						
1984			1	2	6	21	18	26	28	19	20	31	20	31	16	31	23	14	15	9	10	7	6	4	2	3		1			2				
1985						3	17	25	20	29	34	35	37	30	32	26	14	11	14	7	8	5	4	2	1	3	3	1		1	1	1			1

CLASS	VALUE	TOTAL	ACCUM	PERCT	CLASS	VALUE	TOTAL	ACCUM	PERCT	CLASS	VALUE	TOTAL	ACCUM	PERCT
0	0.0	0	5479	100.00	12	36.0	415	2749	50.17	24	290.0	38	199	3.63
1	5.3	9	5479	100.00	13	43.0	376	2334	42.60	25	340.0	38	161	2.94
2	6.3	23	5470	99.84	14	51.0	399	1958	35.74	26	410.0	28	123	2.24
3	7.5	58	5447	99.42	15	60.0	355	1559	28.45	27	490.0	21	95	1.73
4	8.9	90	5389	98.36	16	72.0	247	1204	21.97	28	580.0	21	74	1.35
5	11.0	169	5299	96.71	17	85.0	178	957	17.47	29	690.0	22	53	0.97
6	13.0	254	5130	93.63	18	100.0	168	779	14.22	30	820.0	13	31	0.57
7	15.0	457	4876	88.99	19	120.0	119	611	11.15	31	970.0	8	18	0.33
8	18.0	424	4419	80.65	20	140.0	114	492	8.98	32	1200.0	7	10	0.18
9	21.0	426	3995	72.91	21	170.0	72	378	6.90	33	1400.0	1	3	0.05
10	25.0	382	3569	65.14	22	200.0	56	306	5.58	34	1600.0	2	2	0.04
11	30.0	438	3187	58.17	23	240.0	51	250	4.56					

VALUE EXCEEDED 'P' PERCENT OF TIME

P95 =	12.1
P90 =	14.6
P75 =	20.2
P70 =	22.5
P50 =	36.2
P25 =	66.4
P10 =	131.0

APPENDIX D-2 (CONTINUED)

LOWEST MEAN DISCHARGE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING MARCH 31

YEAR	1	3	7	14	30	60	90	120	183
1972	11.00 6	11.00 6	12.00 6	12.00 6	14.00 6	15.00 6	15.00 4	15.00 4	19.00 3
1973	12.00 9	12.00 7	13.00 9	14.00 10	14.00 7	17.00 10	23.00 12	26.00 12	38.00 12
1974	16.00 12	16.00 12	16.00 12	16.00 12	17.00 12	18.00 11	18.00 9	22.00 10	37.00 11
1975	13.00 10	13.00 11	15.00 11	15.00 11	16.00 11	18.00 12	19.00 11	20.00 9	29.00 10
1976	11.00 7	12.00 8	12.00 7	13.00 7	14.00 8	16.00 7	18.00 10	19.00 8	23.00 4
1977	6.80 2	7.00 2	7.20 2	7.70 2	8.10 2	9.50 1	10.00 1	11.00 1	11.00 1
1978	5.30 1	5.60 1	5.90 1	6.30 1	7.40 1	10.00 3	11.00 2	12.00 2	18.00 2
1979	20.00 13	21.00 13	22.00 13	22.00 13	25.00 13	31.00 13	37.00 13	44.00 13	47.00 13
1980	29.00 14	29.00 14	31.00 14	31.00 14	37.00 14	45.00 14	69.00 14	96.00 14	88.00 14
1981	9.00 4	9.30 4	9.70 4	10.00 4	11.00 4	14.00 4	15.00 5	16.00 5	24.00 7
1982	12.00 8	13.00 9	14.00 10	14.00 8	15.00 10	16.00 8	16.00 6	18.00 6	26.00 8
1983	13.00 11	13.00 10	13.00 8	14.00 9	14.00 9	14.00 5	16.00 7	19.00 7	23.00 5
1984	7.40 3	7.50 3	7.70 3	7.90 3	8.30 3	9.80 2	12.00 3	14.00 3	24.00 6
1985	11.00 5	11.00 5	12.00 5	12.00 5	13.00 5	16.00 9	18.00 8	23.00 11	29.00 9

HIGHEST MEAN DISCHARGE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING SEPTEMBER 30

YEAR	1	3	7	15	30	60	90	120	183
1971	1050.00 8	586.00 9	479.00 7	287.00 7	214.00 8	138.00 11	106.00 12	93.00 12	74.00 12
1972	789.00 13	406.00 14	314.00 13	276.00 10	195.00 9	136.00 12	114.00 11	98.00 11	84.00 11
1973	1180.00 7	703.00 6	435.00 8	352.00 4	247.00 5	197.00 4	157.00 5	139.00 4	152.00 2
1974	869.00 10	544.00 10	401.00 9	277.00 9	173.00 12	142.00 10	149.00 7	132.00 7	107.00 8
1975	1880.00 1	1000.00 2	546.00 4	348.00 5	274.00 3	225.00 3	209.00 2	192.00 1	150.00 3
1976	1290.00 6	610.00 7	349.00 10	274.00 11	234.00 6	176.00 7	147.00 8	126.00 9	92.00 10
1977	856.00 11	438.00 13	237.00 15	144.00 15	91.00 15	85.00 15	66.00 15	54.00 15	39.00 15
1978	1520.00 3	836.00 3	583.00 3	402.00 2	257.00 4	183.00 6	159.00 4	134.00 6	124.00 5
1979	1380.00 4	836.00 4	670.00 1	494.00 1	390.00 1	280.00 1	210.00 1	172.00 2	165.00 1
1980	827.00 12	601.00 8	493.00 6	286.00 8	181.00 10	152.00 9	120.00 10	131.00 8	114.00 6
1981	700.00 14	379.00 15	243.00 14	176.00 14	140.00 14	103.00 14	83.00 14	78.00 14	67.00 14
1982	1310.00 5	710.00 5	529.00 5	347.00 6	276.00 2	228.00 2	189.00 3	160.00 2	125.00 4
1983	664.00 15	505.00 12	318.00 12	203.00 13	173.00 13	121.00 13	94.00 13	79.00 13	69.00 13
1984	947.00 9	507.00 11	325.00 11	240.00 12	181.00 11	163.00 8	134.00 9	120.00 10	103.00 9
1985	[illegible] 2	1090.00 1	603.00 2	357.00 3	232.00 7	191.00 5	155.00 6	135.00 5	113.00 7

ANNUAL VALUES

ANNUAL MEAN DISCHARGE AND RANKING IN YEAR ENDING MARCH 31

1972	38.00 2
1973	97.00 13
1974	76.00 8
1975	84.00 12
1976	75.00 7
1977	27.00 1
1978	61.00 5
1979	83.00 11
1980	125.00 14
1981	44.00 4
1982	78.00 10
1983	41.00 3
1984	63.00 6
1985	77.00 9

ANNUAL MEAN DISCHARGE AND RANKING IN YEAR ENDING SEPTEMBER 30

1971	46.00 12
1972	55.00 11
1973	102.00 2
1974	67.00 8
1975	87.00 3
1976	59.00 10
1977	25.00 15
1978	85.00 4
1979	117.00 1
1980	83.00 5
1981	42.00 14
1982	73.00 6
1983	44.00 13
1984	65.00 9
1985	71.00 7

APPENDIX D-2 (CONTINUED)

NORMAL MONTHLY MEANS (ALL DAYS)

YEAR	OCT	NOV	DEC	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT
1971	17.00	17.60	25.40	41.40	221.00	64.50	28.00	62.60	41.10	20.30	14.40	16.40
1972	15.70	15.60	65.80	53.50	36.60	81.90	189.00	71.30	52.70	25.60	19.30	28.70
1973	31.00	230.00	147.00	82.70	68.70	224.00	161.00	62.30	103.00	70.90	29.10	18.30
1974	17.50	29.20	60.20	156.00	93.50	109.00	140.00	55.20	65.40	38.20	21.10	20.90
1975	16.80	21.50	60.80	170.00	233.00	177.00	177.00	81.80	52.70	26.40	19.50	15.70
1976	21.00	20.90	76.70	126.00	182.00	112.00	37.30	24.30	41.00	43.50	15.90	10.70
1977	11.60	12.10	12.00	8.48	52.60	56.40	82.20	24.00	14.60	8.18	13.00	12.70
1978	42.80	24.50	205.00	44.90	29.40	219.00	127.00	112.00	60.90	37.60	72.80	35.10
1979	35.80	43.00	93.20	89.30	112.00	174.00	128.00	55.50	78.30	219.00	312.00	62.70
1980	37.40	162.00	125.00	69.40	79.70	171.00	78.20	49.50	114.00	30.90	60.30	22.60
1981	18.90	17.00	17.90	11.70	84.80	25.60	47.70	130.00	59.40	53.50	27.80	21.90
1982	17.10	15.90	26.40	142.00	216.00	188.00	97.10	69.30	42.90	26.10	30.00	16.10
1983	13.90	20.50	57.30	37.80	47.20	30.40	118.00	121.00	40.00	25.70	14.50	8.37
1984	13.50	56.30	95.80	34.30	86.20	145.00	166.00	79.00	36.60	30.10	17.30	16.20
1985	26.60	53.80	101.00	69.10	179.00	153.00	99.20	79.40	40.80	23.70	19.40	14.20

	OCT	NOV	DEC	JAN	FEB	MARCH
TWENTY FIFTH PERCENTILE	15.70	17.00	26.40	37.80	52.60	64.50
FIFTIETH PERCENTILE	17.50	21.50	65.80	69.10	86.20	145.00
SEVENTY FIFTH PERCENTILE	31.00	53.80	101.00	126.00	182.00	177.00

	APRIL	MAY	JUNE	JULY	AUG	SEPT
TWENTY FIFTH PERCENTILE	78.20	55.20	40.80	25.60	15.90	14.20
FIFTIETH PERCENTILE	118.00	69.30	52.70	30.10	19.50	16.39
SEVENTY FIFTH PERCENTILE	161.00	81.80	66.40	43.50	30.00	22.60

APPENDIX D-3. STATISTICAL STREAM FLOW DATA FOR EAST FORK WHITEWATER RIVER AT RICHMOND (49)

03275500 EAST FORK WHITEWATER RIVER AT RICHMOND, IN

LOCATION.--Lat 39°48'24", long 84°54'28", in NW¼SW¼ sec.8, T.13 N., R.1 W., Wayne County, Hydrologic Unit 05080003, on left bank 50 ft downstream from highway bridge, 0.8 mi south of Richmond, 1.5 mi upstream from Short Creek, and at mile 33.4.

DRAINAGE AREA.--121 mi^2.

PERIOD OF RECORD.--April 1949 to September 1978 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 854.01 ft above National Geodetic Vertical Datum of 1929 (levels by State of Indiana, Department of Natural Resources). Prior to July 27, 1949, nonrecording gage at same site and datum.

REMARKS.--Some regulation at low flow by powerplant upstream from station. Natural flow also affected by diversion of municipal water supply by City of Richmond.

AVERAGE DISCHARGE.--29 years, 125 ft^3/s, 12.91 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,000 ft^3/s July 20, 1969, gage height, 12.68 ft, from rating curve extended above 5,000 ft^3/s on basis of contracted-opening measurement of peak flow at stage of 12.44 ft; minimum daily, 1.2 ft^3/s Aug. 1, 1954.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in March 1913 reached a stage of 15.0 ft, from floodmarks (discharge not determined).

DURATION TABLE OF DAILY MEAN DISCHARGES FOR YEAR ENDING SEPTEMBER 30

CLASS / YEAR (NUMBER OF DAYS IN CLASS)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1950												1	18	38	39	23	35	32	33	37	35	20	17	5	9	7	2	3		3	2	4	2		
1951										1	22	19	14	10	20	29	25	48	28	37	35	21	17	8	5	10	7	3	2	1		2	1		
1952								1	2	10	51	25	24	20	22	15	25	20	20	39	28	20	15	10	4	5	4	1		1	2	1		1	
1953						2	5	9	20	13	49	12	24	21	29	33	41	40	21	14	8	9	2	5	2	2	3		1						
1954		3	2	2	6	6	8	33	34	53	41	22	50	28	15	15	16	10	5	4	4	3	3		2										
1955		1	1	1	4	8	5	15	10	13	26	36	26	35	34	27	27	19	19	21	10	9	5	4	4	3	2								
1956					5	4	5	13	10	10	7	8	20	51	26	30	28	29	23	25	18	11	7	7	2	1	1	2	1		1		1		
1957							7	15	7	21	27	32	39	24	26	37	28	22	19	21	7	11	5	5	3	1	4		2			1	1		
1958											4	7	18	10	18	48	51	49	40	33	17	14	13	10	7	8	4	3	4	2	2	1	2		
1959								5	14	11	16	16	14	15	32	50	26	40	29	28	22	18	12	6	2	5		1		1			1		1
1960					1	3	4	5	15	6	27	18	44	20	37	71	43	27	13	12	6	5	3	2	1	2			1						
1961									31	45	48	24	29	29	15	23	19	9	15	12	13	16	8	8	6	3	4	6	1			1			
1962											20	31	54	37	37	37	31	35	20	18	11	8	5	4	8	4	1	1	1	1	1				
1963								4	20	8	24	85	56	30	23	23	17	12	10	9	9	9	7	7	4	1	2	1	1	1			2		
1964							8	7	53	51	66	16	17	23	15	19	13	16	14	10	7	6	5	6	5	2	2	1		1	1	2			
1965								3	43	45	48	47	19	21	9	20	20	20	15	15	9	9	10	3	3	2	2		1	1					
1966									12	17	44	51	52	35	35	32	26	23	12	7	7	2	6		2		1	1							
1967											8	26	47	20	25	30	24	37	28	23	23	17	19	10	8	5	5	3	4		2	1			
1968											5	18	44	20	47	39	22	32	24	28	30	15	13	7	6	4	4	2	2	2		1	1		
1969											2	21	26	17	17	32	57	58	28	25	23	14	9	8	3	5	1	2		4	2			1	
1970											9	43	59	32	34	25	24	32	25	26	21	15	7	4	4	1	2			1			1		
1971									7	8	39	52	62	44	28	29	20	19	12	14	7	9	3	5	3		2	1		1					
1972										8	57	43	22	22	22	40	31	29	24	26	12	9	10	4	2	1	3			1					
1973												16	26	16	22	15	38	45	22	48	33	23	21	15	9	8	3	2	1	2					
1974											4	43	50	26	32	26	28	45	20	24	18	16	12	5	6	8	1		1						
1975										8	18	29	54	30	17	12	17	35	27	28	26	14	18	10	8	4	3	2	1	1	2			1	
1976									13	14	28	59	49	29	40	28	22	23	17	15	10	4	5	4	4	1					1				
1977							4	10	30	68	79	34	22	16	24	14	14	20	7	7	8	1		4		1		2							
1978												3	50	40	30	49	40	33	24	29	19	8	8	11	5	6	2	3		2	1	1	1		

CLASS	VALUE	TOTAL	ACCUM	PERCT	CLASS	VALUE	TOTAL	ACCUM	PERCT	CLASS	VALUE	TOTAL	ACCUM	PERCT
0	0.0	0	10592	100.00	12	20.0	1029	8040	75.91	24	450.0	127	431	4.07
1	1.2	4	10592	100.00	13	26.0	759	7011	66.19	25	580.0	100	304	2.87
2	1.6	3	10588	99.96	14	34.0	780	6252	59.03	26	760.0	65	204	1.93
3	2.0	3	10585	99.93	15	44.0	871	5472	51.66	27	980.0	40	139	1.31
4	2.6	16	10582	99.91	16	57.0	808	4601	43.44	28	1300.0	24	99	0.93
5	3.4	23	10566	99.75	17	74.0	859	3793	35.81	29	1600.0	26	75	0.71
6	4.4	46	10543	99.54	18	96.0	604	2934	27.70	30	2100.0	17	49	0.46
7	5.6	120	10497	99.10	19	120.0	645	2330	22.00	31	2700.0	15	32	0.30
8	7.3	321	10377	97.97	20	160.0	476	1685	15.91	32	3600.0	13	17	0.16
9	9.4	410	10056	94.94	21	210.0	336	1209	11.41	33	4600.0	3	4	0.04
10	12.0	769	9646	91.07	22	270.0	265	873	8.24	34	6000.0	1	1	0.01
11	16.0	837	8877	83.81	23	350.0	177	608	5.74					

APPENDIX D-3 (CONTINUED)

VALUE EXCEEDED 'P' PERCENT OF TIME

P95 =	9.4
P90 =	12.6
P75 =	20.6
P70 =	23.7
P50 =	46.6
P25 =	107.0
P10 =	237.0

LOWEST MEAN DISCHARGE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING MARCH 31

YEAR	1	3	7	14	30	60	90	120	183
1951	18.00 27	20.00 27	22.00 27	28.00 27	51.00 28	57.00 28	67.00 28	74.00 28	90.00 26
1952	9.60 16	11.00 16	12.00 16	13.00 17	14.00 16	16.00 15	17.00 12	20.00 14	51.00 21
1953	6.80 10	7.70 13	10.00 14	12.00 14	13.00 13	14.00 12	14.00 9	16.00 9	24.00 12
1954	4.10 5	4.20 5	4.60 5	5.60 5	7.80 5	8.10 2	8.70 2	9.80 3	12.00 1
1955	1.19 1	1.80 1	2.40 1	3.20 1	4.50 1	11.00 9	13.00 8	15.00 7	16.00 6
1956	1.40 2	2.30 2	3.20 2	5.40 3	6.30 3	9.10 5	20.00 16	27.00 21	35.00 18
1957	2.90 3	3.10 3	3.60 3	4.20 2	5.90 2	6.90 1	8.30 1	9.50 1	14.00 5
1958	12.00 18	13.00 18	14.00 20	15.00 19	17.00 19	24.00 24	25.00 23	28.00 22	86.00 25
1959	37.00 28	38.00 28	41.00 28	41.00 28	44.00 27	51.00 27	61.00 27	66.00 26	141.00 28
1960	6.10 8	6.40 8	7.20 8	7.80 8	9.90 11	14.00 10	17.00 13	19.00 12	26.00 13
1961	3.20 4	3.50 4	4.50 4	5.50 4	7.80 6	8.60 3	10.00 3	11.00 4	12.00 2
1962	12.00 19	13.00 19	13.00 18	14.00 18	15.00 17	18.00 18	21.00 20	24.00 19	37.00 20
1963	12.00 20	13.00 20	14.00 19	17.00 22	17.00 20	22.00 22	21.00 21	22.00 16	26.00 14
1964	5.20 7	5.20 7	5.20 6	6.00 6	7.60 4	9.10 4	10.00 4	9.70 2	12.00 3
1965	6.60 9	7.60 12	8.40 11	8.70 10	9.40 9	10.00 7	11.00 5	12.00 5	17.00 7
1966	7.10 12	7.50 11	8.50 12	9.20 11	9.90 10	11.00 8	12.00 6	17.00 10	20.00 9
1967	7.40 13	7.40 9	7.70 9	9.30 12	13.00 14	17.00 16	17.00 14	22.00 17	34.00 16
1968	14.00 21	15.00 21	15.00 21	16.00 20	17.00 21	19.00 19	20.00 17	22.00 18	36.00 19
1969	14.00 22	15.00 22	16.00 22	18.00 23	19.00 23	23.00 23	36.00 26	71.00 27	105.00 27
1970	16.00 25	16.00 25	20.00 26	21.00 26	23.00 26	25.00 25	29.00 25	49.00 25	54.00 22
1971	14.00 23	15.00 23	16.00 23	17.00 21	17.00 22	19.00 20	21.00 18	21.00 15	26.00 15
1972	8.30 14	8.90 14	9.70 13	12.00 13	12.00 12	15.00 13	16.00 10	16.00 8	19.00 8
1973	9.60 15	11.00 17	12.00 17	13.00 15	14.00 15	16.00 14	21.00 19	25.00 20	54.00 23
1974	17.00 26	17.00 26	18.00 25	19.00 25	20.00 24	21.00 21	22.00 22	35.00 24	67.00 24
1975	14.00 24	15.00 24	16.00 24	18.00 24	21.00 25	26.00 26	28.00 24	28.00 23	35.00 17
1976	9.80 17	10.00 15	11.00 15	13.00 16	16.00 18	18.00 17	18.00 15	20.00 13	23.00 10
1977	7.00 11	7.40 10	7.80 10	8.30 9	8.80 7	9.50 6	12.00 7	13.00 6	13.00 4
1978	5.10 6	5.10 6	6.00 7	7.40 7	8.80 8	14.00 11	16.00 11	17.00 11	23.00 11

HIGHEST MEAN DISCHARGE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING SEPTEMBER 30

YEAR	1	3	7	15	30	60	90	120	183
1950	4300.00 7	2790.00 3	1780.00 2	1440.00 1	989.00 1	766.00 1	582.00 1	500.00 1	368.00 1
1951	4260.00 8	1900.00 13	1040.00 13	758.00 9	490.00 11	407.00 9	367.00 6	366.00 3	322.00 2
1952	5340.00 3	2680.00 4	1290.00 8	850.00 8	540.00 8	462.00 4	379.00 4	354.00 4	283.00 4
1953	1360.00 24	827.00 24	653.00 20	475.00 21	289.00 23	187.00 25	176.00 23	155.00 23	131.00 22
1954	552.00 29	310.00 29	208.00 29	190.00 29	159.00 29	98.00 29	77.00 29	66.00 29	51.00 29
1955	958.00 28	591.00 28	401.00 28	343.00 24	276.00 24	214.00 23	179.00 22	163.00 22	123.00 23
1956	4240.00 9	1860.00 14	911.00 15	496.00 19	369.00 17	302.00 16	242.00 19	204.00 19	183.00 15
1957	4230.00 10	2100.00 10	1010.00 14	587.00 14	358.00 18	276.00 18	292.00 13	240.00 13	186.00 13
1958	4140.00 11	2290.00 7	1940.00 1	1120.00 2	670.00 4	612.00 2	466.00 2	401.00 2	300.00 3
1959	8700.00 1	3620.00 1	1700.00 4	920.00 6	763.00 2	496.00 3	378.00 5	320.00 6	242.00 9
1960	1320.00 25	717.00 27	515.00 24	299.00 25	218.00 26	146.00 27	125.00 27	112.00 26	98.00 26
1961	3740.00 14	1590.00 16	1090.00 12	739.00 11	533.00 10	412.00 8	357.00 7	307.00 7	215.00 11
1962	2440.00 17	1230.00 17	620.00 21	511.00 17	383.00 16	288.00 17	250.00 18	212.00 18	168.00 19
1963	4380.00 6	3280.00 2	1670.00 5	997.00 3	685.00 3	446.00 5	322.00 10	252.00 11	176.00 16
1964	2890.00 16	1970.00 12	1150.00 10	695.00 13	466.00 13	417.00 7	305.00 11	244.00 12	169.00 18
1965	1620.00 21	970.00 19	541.00 23	374.00 23	308.00 22	244.00 20	225.00 20	184.00 20	132.00 21
1966	1110.00 27	736.00 26	458.00 27	269.00 28	166.00 28	108.00 28	112.00 28	102.00 27	83.00 27
1967	3120.00 15	2070.00 11	1420.00 6	867.00 7	537.00 9	338.00 13	324.00 9	274.00 8	280.00 5
1968	4400.00 5	2240.00 9	1760.00 3	976.00 4	591.00 5	344.00 11	302.00 12	254.00 10	222.00 10
1969	5950.00 2	2480.00 6	1140.00 11	712.00 12	487.00 12	336.00 14	285.00 14	232.00 16	206.00 12
1970	3770.00 12	1690.00 15	905.00 16	535.00 16	449.00 15	305.00 15	269.00 15	225.00 17	171.00 17

APPENDIX D-3 (CONTINUED)

HIGHEST MEAN DISCHARGE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING SEPTEMBER 30--Continued

1971	1660.00 20	910.00 21	719.00 17	434.00 22	322.00 20	226.00 22	169.00 25	[illegible] 24	117.00 24
1972	1600.00 22	815.00 25	618.00 22	483.00 20	344.00 19	241.00 21	201.00 21	[illegible] 21	141.00 20
1973	1970.00 19	1090.00 18	714.00 18	576.00 15	451.00 14	340.00 12	265.00 16	[illegible] 14	249.00 8
1974	1380.00 23	885.00 22	687.00 19	502.00 18	321.00 21	247.00 19	256.00 17	232.00 15	183.00 14
1975	4620.00 4	2570.00 5	1270.00 9	745.00 10	548.00 7	439.00 6	388.00 3	351.00 5	279.00 6
1976	2160.00 18	936.00 20	472.00 25	295.00 26	273.00 25	212.00 24	173.00 24	145.00 25	108.00 25
1977	1280.00 26	879.00 23	471.00 26	281.00 27	188.00 27	163.00 26	126.00 26	101.00 28	72.00 28
1978	3660.00 13	2260.00 8	1300.00 7	972.00 5	550.00 6	374.00 10	331.00 8	266.00 9	253.00 7

ANNUAL VALUES

ANNUAL MEAN DISCHARGE AND RANKING
IN YEAR ENDING MARCH 31

1951	206.00	27
1952	173.00	25
1953	69.00	8
1954	52.00	2
1955	69.00	9
1956	102.00	14
1957	53.00	3
1958	143.00	21
1959	256.00	28
1960	71.00	10
1961	64.00	5
1962	146.00	22
1963	95.00	13
1964	68.00	7
1965	92.00	11
1966	66.00	6
1967	131.00	20
1968	121.00	17
1969	181.00	26
1970	126.00	18
1971	103.00	15
1972	54.00	4
1973	158.00	24
1974	129.00	19
1975	153.00	23
1976	94.00	12
1977	38.00	1
1978	117.00	16

ANNUAL MEAN DISCHARGE AND RANKING
IN YEAR ENDING SEPTEMBER 30

1950	223.00	1
1951	194.00	3
1952	156.00	7
1953	76.00	21
1954	32.00	29
1955	73.00	23
1956	111.00	13
1957	103.00	15
1958	208.00	2
1959	139.00	11
1960	62.00	26
1961	116.00	12
1962	102.00	17
1963	99.00	18
1964	90.00	19
1965	74.00	22
1966	52.00	27
1967	170.00	4
1968	156.00	8
1969	161.00	6
1970	103.00	16
1971	69.00	24
1972	84.00	20
1973	169.00	5
1974	109.00	14
1975	154.00	9
1976	67.00	25
1977	43.00	28
1978	150.00	10

NORMAL MONTHLY MEANS (ALL DAYS)

YEAR	OCT	NOV	DEC	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT
1950	81.70	32.70	107.00	957.00	567.00	216.00	241.00	111.00	110.00	57.90	70.50	142.00
1951	79.50	281.00	303.00	347.00	456.00	290.00	262.00	101.00	129.00	62.10	20.50	18.00
1952	14.90	75.60	382.00	461.00	273.00	273.00	208.00	70.10	56.50	25.00	19.80	15.60
1953	12.90	19.30	52.40	108.00	77.30	167.00	77.70	273.00	71.30	27.20	12.40	9.24
1954	8.77	11.30	15.50	32.30	24.70	54.80	134.00	31.70	29.80	10.90	25.60	5.41
1955	19.00	19.00	49.00	94.20	217.00	207.00	115.00	45.80	44.20	38.80	9.35	27.60
1956	48.90	294.00	53.10	35.30	373.00	155.00	203.00	91.80	52.30	32.50	10.80	7.28
1957	8.13	13.60	26.50	55.00	86.10	55.30	358.00	188.00	[illegible]	78.80	22.20	28.30
1958	26.00	59.50	357.00	126.00	81.40	84.80	134.00	254.00	[illegible]	350.00	323.00	59.10
1959	49.40	87.90	69.80	507.00	411.00	199.00	159.00	105.00	48.80	23.50	16.00	14.80
1960	25.10	40.30	58.70	107.00	183.00	77.10	64.70	83.70	60.50	24.60	15.70	7.91
1961	9.43	13.20	11.60	16.60	69.50	383.00	434.00	201.00	152.00	40.40	32.70	23.60
1962	18.30	28.00	99.40	260.00	212.00	285.00	66.20	103.00	41.50	82.80	27.50	22.90
1963	24.70	26.10	18.60	34.20	42.90	636.00	228.00	78.70	27.70	31.40	17.70	8.59
1964	9.67	12.80	7.81	19.00	16.20	353.00	456.00	91.00	63.90	32.70	13.10	9.93
1965	10.40	15.60	17.60	51.80	173.00	183.00	303.00	69.60	22.50	12.10	10.90	28.60
1966	30.90	19.70	20.50	64.10	157.00	59.60	97.90	93.10	33.30	16.00	22.10	24.50
1967	33.90	195.00	457.00	89.30	129.00	372.00	171.00	406.00	88.30	45.10	21.80	17.40
1968	21.20	26.90	283.00	146.00	106.00	108.00	137.00	535.00	125.00	98.30	233.00	34.40
1969	22.10	116.00	225.00	383.00	177.00	72.60	151.00	169.00	175.00	324.00	83.00	33.10
1970	25.20	76.60	67.00	89.60	163.00	158.00	449.00	77.20	65.80	32.50	30.80	17.50
1971	21.70	24.40	30.10	56.30	329.00	131.00	46.40	116.00	37.50	22.60	14.50	17.20
1972	18.30	15.60	78.20	83.70	59.50	132.00	333.00	141.00	82.40	28.60	16.00	21.30
1973	37.00	319.00	262.00	134.00	117.00	405.00	256.00	98.40	158.00	156.00	59.20	20.50
1974	21.70	56.00	116.00	286.00	165.00	155.00	260.00	97.40	60.10	28.40	29.10	35.80
1975	21.80	39.30	167.00	310.00	480.00	335.00	282.00	118.00	64.10	23.00	17.50	19.20
1976	24.40	20.10	62.20	170.00	192.00	141.00	46.10	28.60	65.50	31.50	17.70	10.40
1977	15.40	16.30	11.50	9.08	80.20	129.00	147.00	43.10	18.50	12.20	22.70	15.20
1978	43.20	47.10	406.00	90.00	49.50	494.00	220.00	245.00	73.40	36.60	51.80	31.10

APPENDIX D-3 (CONTINUED)

NORMAL MONTHLY MEANS (ALL DAYS)

	OCT	NOV	DEC	JAN	FEB	MARCH
TWENTY FIFTH PERCENTILE	15.20	17.60	23.50	53.40	73.40	119.00
FIFTIETH PERCENTILE	21.80	28.00	67.00	94.20	163.00	167.00
SEVENTY FIFTH PERCENTILE	32.40	76.10	244.00	273.00	245.00	313.00

	APRIL	MAY	JUNE	JULY	AUG	SEPT
TWENTY FIFTH PERCENTILE	125.00	77.90	42.80	24.00	15.90	12.60
FIFTIETH PERCENTILE	203.00	101.00	64.10	32.50	21.80	19.19
SEVENTY FIFTH PERCENTILE	272.00	179.00	118.00	60.00	31.70	28.40

APPENDIX D-4. STATISTICAL STREAM FLOW DATA FOR EAST FORK WHITEWATER RIVER AT ABINGTON (49)

03275600 EAST FORK WHITEWATER RIVER AT ABINGTON, IN

LOCATION.--Lat 39°43'57", long 84°57'35", in NE¼SW¼ sec.2, T.12 N., R.2 W., Wayne County, Hydrologic Unit 05080003, at downstream side of center pier of bridge on county road at Abington, 3 mi downstream from Elkhorn Creek, 8 mi southwest of Richmond, and at mile 26.7.

DRAINAGE AREA.--200 mi^2.

PERIOD OF RECORD.--October 1965 to September 1985.

GAGE.--Water-stage recorder. Datum of gage is 791.00 ft above National Geodetic Vertical Datum of 1929.

AVERAGE DISCHARGE.--20 years, 221 ft^3/s, 15.68 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,400 ft^3/s July 20, 1969, gage height, 16.18 ft; minimum daily, 14 ft^3/s Sept. 11, 15, 1983.

DURATION TABLE OF DAILY MEAN DISCHARGES FOR YEAR ENDING SEPTEMBER 30

NUMBER OF DAYS IN CLASS

CLASS / YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1966				10	29	34	47	39	37	28	32	19	29	8	19	9	5	7	4	3	3		1		1		1								
1967					15	24	17	21	17	9	20	23	34	21	34	24	19	17	10	16	6	8	8	6	2	3	3	4		1	1	2			
1968					4	6	8	14	22	35	48	21	24	25	23	18	28	19	12	18	8	8	6	4	2	4	2		4		1	1		1	
1969							9	25	27	15	14	28	37	29	39	38	20	11	21	14	10	2	8	5	3	2			1	3	1	2		1	
1970						3	55	44	38	24	27	13	24	15	26	23	21	15	11	6	7	3	3	1	3					1	1			1	
1971					20	27	35	40	49	29	35	23	24	12	14	11	8	7	5	7	4	3	2	3	2		1	1	1	1		1			
1972					18	41	50	20	17	17	26	20	34	16	19	20	11	16	10	8	7	8	2	1		1	3			1					
1973							19	24	15	10	13	15	45	22	31	23	24	23	21	17	16	15	9	6	3	5	2	3	2		2				
1974							41	43	28	26	20	16	27	13	42	17	21	15	6	13	10	6	2	3	9	6				1					
1975				9	9	23	23	40	20	12	18	9	21	10	34	20	23	18	16	13	13	9	6	5	3	1	1	2	3	2			1		1
1976			13	18	22	19	45	31	33	21	23	21	27	14	22	14	10	5	7	3	3	5	5	3	1							1			
1977		6	11	75	69	39	29	13	11	13	20	11	13	5	16	10	6	2	8	2		2		1	1				1	1					
1978						1	25	22	35	29	34	35	30	14	26	17	16	13	17	9	9	6	10	4	5		2	1	1	1	1			2	
1979							5	5	16	19	11	19	37	18	47	40	30	26	20	10	11	12	6	5	6	4	6	4	2	2	3	1			
1980						2	7	7	9	13	25	15	33	27	53	38	21	27	21	17	14	7	7	9	2	5		4	2	1					
1981						26	78	28	22	24	13	24	24	13	21	18	19	14	12	7	9	6	1	3	2	1									
1982						13	47	38	29	20	20	15	29	11	29	21	15	14	13	13	11	4	7	4	5			3		1	1	1	1		
1983		12	7	22	10	42	28	10	9	10	25	31	53	17	27	16	10	11	7	4	1	4	2	2		2		2	1						
1984			1	4	6	14	18	30	21	33	25	20	34	16	32	19	22	11	12	13	9	9	3	5	2	4	2		1						
1985					18	9	14	23	16	14	23	32	37	22	36	21	23	16	15	12	9	4	4	2	4	3	2	1	3		1	1			

CLASS	VALUE	TOTAL	ACCUM	PERCT
0	0.0	0	7305	100.00
1	14.0	18	7305	100.00
2	17.0	32	7287	99.75
3	20.0	138	7255	99.32
4	25.0	220	7117	97.43
5	30.0	323	6897	94.41
6	36.0	600	6574	89.99
7	44.0	517	5974	81.78
8	53.0	471	5457	74.70
9	64.0	401	4986	68.25
10	77.0	472	4585	62.77
11	93.0	410	4113	56.30
12	110.0	616	3703	50.69
13	140.0	328	3087	42.26
14	160.0	590	2759	37.77
15	200.0	417	2169	29.69
16	240.0	352	1752	23.98
17	290.0	287	1400	19.16
18	350.0	248	1113	15.24
19	420.0	205	865	11.84
20	510.0	160	660	9.03
21	620.0	121	500	6.84
22	750.0	92	379	5.19
23	900.0	72	287	3.93
24	1100.0	56	215	2.94
25	1300.0	41	159	2.18
26	1600.0	25	118	1.62
27	1900.0	25	93	1.27
28	2300.0	22	68	0.93
29	2800.0	16	46	0.63
30	3400.0	12	30	0.41
31	4100.0	10	18	0.25
32	5000.0	2	8	0.11
33	6000.0	5	6	0.08
34	7300.0	1	1	0.01

VALUE EXCEEDED 'P' PERCENT OF TIME

P95 = 29.0
P90 = 36.0
P75 = 52.6
P70 = 61.0
P50 = 112.0
P25 = 233.0
P10 = 479.0

APPENDIX D-4 (CONTINUED)

LOWEST MEAN DISCHARGE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING MARCH 31

YEAR	1	3	7	14	30	60	90	120	183
1967	21.00 5	22.00 5	24.00 5	26.00 4	33.00 7	37.00 7	41.00 7	48.00 7	68.00 7
1968	26.00 6	27.00 6	28.00 6	30.00 6	31.00 5	34.00 3	39.00 6	50.00 9	81.00 9
1969	46.00 18	46.00 18	48.00 18	53.00 18	55.00 18	61.00 17	79.00 18	146.00 18	208.00 18
1970	36.00 16	37.00 16	40.00 17	42.00 15	48.00 15	50.00 14	57.00 14	99.00 17	108.00 16
1971	35.00 13	35.00 13	36.00 13	38.00 12	39.00 12	48.00 13	51.00 13	56.00 11	63.00 6
1972	26.00 7	27.00 7	28.00 7	30.00 7	30.00 4	35.00 4	37.00 3	37.00 2	47.00 2
1973	26.00 8	27.00 8	29.00 8	31.00 8	33.00 6	36.00 5	44.00 8	48.00 8	102.00 14
1974	38.00 17	39.00 17	39.00 14	40.00 13	44.00 14	45.00 12	49.00 11	71.00 14	141.00 17
1975	36.00 14	37.00 14	39.00 15	47.00 17	51.00 16	60.00 16	66.00 16	65.00 13	98.00 12
1976	20.00 4	21.00 4	22.00 4	27.00 5	34.00 8	37.00 8	38.00 4	43.00 5	50.00 3
1977	17.00 3	18.00 3	18.00 2	20.00 2	21.00 2	23.00 1	26.00 1	28.00 1	27.00 1
1978	16.00 2	16.00 2	18.00 3	22.00 3	25.00 3	36.00 6	39.00 5	40.00 4	51.00 4
1979	36.00 15	37.00 15	40.00 16	45.00 16	51.00 17	78.00 18	78.00 17	86.00 16	108.00 15
1980	52.00 19	56.00 19	73.00 19	84.00 19	110.00 19	139.00 19	213.00 19	325.00 19	293.00 19
1981	30.00 9	31.00 9	32.00 9	33.00 9	35.00 10	43.00 11	46.00 9	46.00 6	78.00 8
1982	31.00 11	32.00 11	33.00 10	35.00 11	36.00 11	42.00 10	49.00 10	52.00 10	90.00 11
1983	32.00 12	32.00 12	33.00 11	33.00 10	34.00 9	41.00 9	51.00 12	61.00 12	82.00 10
1984	14.00 1	15.00 1	15.00 1	16.00 1	18.00 1	23.00 2	28.00 2	39.00 3	61.00 5
1985	30.00 10	31.00 10	35.00 12	40.00 14	43.00 13	56.00 15	60.00 15	73.00 15	102.00 13

HIGHEST MEAN DISCHARGE AND RANKING FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING SEPTEMBER 30

YEAR	1	3	7	15	30	60	90	120	183
1966	1820.00 19	1180.00 19	749.00 20	455.00 20	293.00 20	195.00 20	195.00 20	180.00 20	150.00 20
1967	4850.00 7	3310.00 5	2200.00 5	1270.00 6	776.00 8	580.00 9	573.00 6	486.00 7	466.00 4
1968	7250.00 2	4260.00 2	3180.00 1	1910.00 1	1160.00 1	674.00 4	594.00 4	497.00 4	415.00 8
1969	6610.00 4	3400.00 4	1710.00 7	1300.00 5	916.00 6	638.00 8	541.00 7	448.00 10	399.00 10
1970	6200.00 5	2690.00 9	1410.0u 12	808.00 14	749.00 10	519.00 12	463.00 13	402.00 13	311.00 13
1971	4190.00 11	2100.00 12	1630.00 9	985.00 11	763.00 9	514.00 13	384.00 15	348.00 14	267.00 16
1972	3020.00 13	1480.00 17	1190.00 15	951.00 12	681.00 12	474.00 15	399.00 14	346.00 15	289.00 14
1973	3500.00 12	2160.00 10	1490.00 11	1170.00 7	908.00 7	671.00 5	521.00 9	468.00 8	474.00 3
1974	2880.00 15	1820.00 16	1400.00 13	1030.00 10	641.00 14	483.00 14	493.00 10	445.00 11	371.00 11
1975	7870.00 1	4810.00 1	2400.00 2	1380.00 4	1010.00 3	807.00 2	724.00 1	663.00 1	527.00 1
1976	4520.00 8	2010.00 13	1020.00 18	565.00 19	550.00 16	405.00 17	353.00 16	300.00 17	221.00 18
1977	2880.00 16	1990.00 14	1050.00 16	608.00 17	400.00 19	338.00 19	267.00 19	212.00 19	153.00 19
1978	6770.00 3	4050.00 3	2300.00 3	1620.00 2	997.00 4	669.00 6	587.00 5	489.00 6	458.00 5
1979	4290.00 9	2710.00 8	2260.00 4	1500.00 3	1070.00 2	819.00 1	611.00 3	491.00 5	523.00 2
1980	2930.00 14	2120.00 11	1500.00 10	898.00 13	634.00 15	525.00 11	488.00 11	450.00 9	402.00 9
1981	1520.00 20	1030.00 20	753.00 19	586.00 18	518.00 17	428.00 16	346.00 17	315.00 16	271.00 15
1982	5480.00 6	2960.00 6	1740.00 6	1050.00 8	977.00 5	760.00 3	631.00 2	559.00 2	437.00 6
1983	2320.00 18	1970.00 15	1200.00 14	725.00 16	516.00 18	362.00 18	281.00 18	258.00 18	251.00 17
1984	2610.00 17	1420.00 18	1040.00 17	794.00 15	648.00 13	574.00 10	480.00 12	414.00 12	342.00 12
1985	4250.00 10	2930.00 7	1670.00 8	1040.00 9	747.00 11	646.00 7	527.00 8	502.00 3	417.00 7

ANNUAL VALUES

ANNUAL MEAN DISCHARGE AND RANKING IN YEAR ENDING MARCH 31

1967	220.00 8
1968	225.00 10
1969	353.00 18
1970	232.00 11
1971	214.00 7
1972	120.00 2
1973	303.00 16
1974	255.00 12
1975	307.00 17
1976	192.00 6
1977	78.00 1
1978	224.00 9
1979	272.00 13
1980	396.00 19
1981	183.00 4
1982	298.00 15
1983	153.00 3
1984	188.00 5
1985	285.00 14

ANNUAL MEAN DISCHARGE AND RANKING IN YEAR ENDING SEPTEMBER 30

1966	100.00 19
1967	291.00 7
1968	298.00 5
1969	306.00 4
1970	193.00 13
1971	160.00 16
1972	172.00 14
1973	327.00 2
1974	226.00 11
1975	295.00 6
1976	140.00 18
1977	92.00 20
1978	278.00 8
1979	388.00 1
1980	313.00 3
1981	161.00 15
1982	252.00 10
1983	151.00 17
1984	216.00 12
1985	256.00 9

APPENDIX D-4 (CONTINUED)

NORMAL MONTHLY MEANS (ALL DAYS)

YEAR	OCT	NOV	DEC	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT
1966	60.50	47.70	57.60	126.00	273.00	120.00	156.00	175.00	62.80	45.30	43.70	51.10
1967	84.30	311.00	676.00	148.00	229.00	664.00	294.00	724.00	183.00	109.00	42.10	31.90
1968	46.90	87.20	546.00	243.00	188.00	192.00	237.00	1049.0	262.00	234.00	394.00	74.90
1969	56.50	227.00	437.00	708.00	374.00	166.00	319.00	323.00	300.00	536.00	154.00	63.10
1970	48.20	159.00	132.00	219.00	256.00	278.00	748.00	172.00	134.00	59.70	81.80	41.00
1971	56.00	58.90	93.50	125.00	781.00	274.00	100.00	265.00	83.80	61.70	33.70	39.60
1972	38.20	38.10	183.00	181.00	130.00	275.00	659.00	275.00	152.00	54.90	36.20	43.60
1973	60.20	558.00	499.00	250.00	221.00	823.00	486.00	177.00	319.00	350.00	134.00	46.20
1974	46.00	117.00	207.00	585.00	297.00	293.00	484.00	252.00	213.00	80.70	65.10	81.60
1975	57.00	99.10	310.00	574.00	901.00	615.00	559.00	235.00	119.00	43.00	37.70	41.90
1976	56.90	47.60	180.00	389.00	370.00	239.00	88.70	55.90	138.00	67.50	34.20	21.80
1977	31.90	32.70	26.50	21.30	163.00	256.00	324.00	99.80	37.50	35.80	54.80	33.50
1978	88.80	82.50	757.00	180.00	85.30	884.00	397.00	415.00	161.00	76.30	113.00	66.20
1979	104.00	134.00	397.00	352.00	460.00	592.00	478.00	207.00	132.00	773.00	773.00	242.00
1980	166.00	562.00	388.00	237.00	205.00	576.00	386.00	337.00	419.00	187.00	231.00	66.60
1981	44.90	47.80	54.70	36.70	276.00	126.00	274.00	464.00	250.00	216.00	92.00	55.10
1982	44.80	53.10	147.00	642.00	710.00	529.00	300.00	214.00	193.00	63.70	110.00	51.30
1983	34.00	99.50	317.00	164.00	179.00	113.00	271.00	442.00	87.30	55.90	27.50	19.90
1984	66.20	188.00	295.00	96.30	217.00	491.00	626.00	304.00	116.00	86.00	66.20	57.80
1985	99.40	219.00	466.00	270.00	543.00	593.00	319.00	287.00	116.00	79.30	68.00	29.90

	OCT	NOV	DEC	JAN	FEB	MARCH
TWENTY FIFTH PERCENTILE	45.20	49.10	136.00	132.00	192.00	204.00
FIFTIETH PERCENTILE	56.20	99.30	298.00	228.00	265.00	286.00
SEVENTY FIFTH PERCENTILE	66.70	211.00	459.00	380.00	439.00	593.00

	APRIL	MAY	JUNE	JULY	AUG	SEPT
TWENTY FIFTH PERCENTILE	272.00	185.00	116.00	56.80	38.40	35.00
FIFTIETH PERCENTILE	322.00	270.00	145.00	77.80	67.10	48.60
SEVENTY FIFTH PERCENTILE	486.00	296.00	241.00	209.00	129.00	65.40

APPENDIX E

CORRELATIONS BETWEEN SOIL PROPERTIES AND INDEX PARAMETERS (50)

Effective Preconsolidation Stress in Cohesive Soils

Correlation with Index Parameters

(I) Stas and Kulhawy[1]:

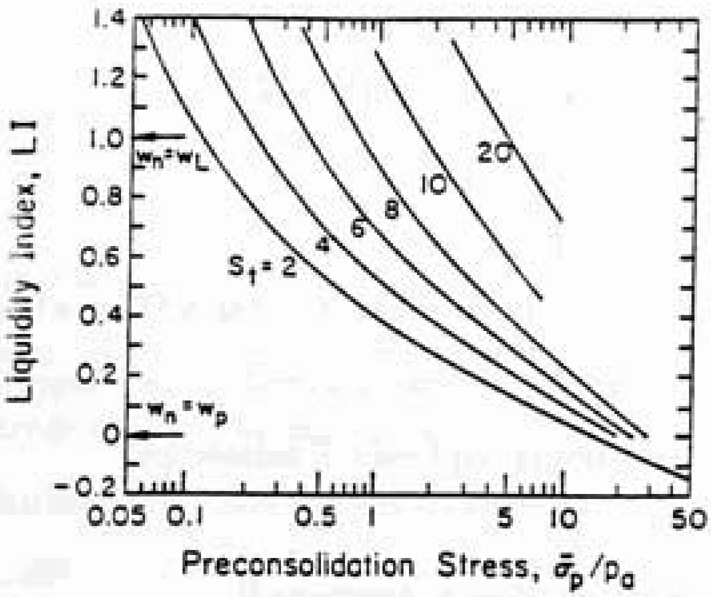
$$\frac{\overline{\sigma_p}}{P_a} = 10^{(1.11-1.62LI)}$$

where $\overline{\sigma_p}$ = largest preconsolidation stress

P_a = atmospheric stress in the desired stress units

LI = liquidity index

(II) NAVFAC[2]:



where S_t = sensitivity

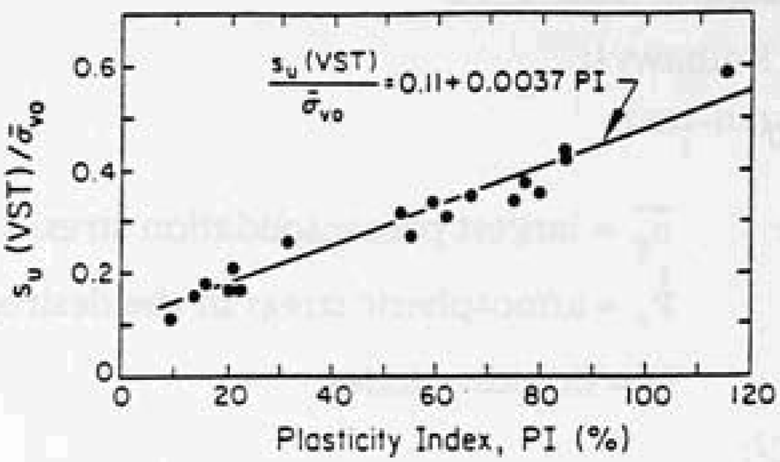
[1]Stas, C. V., and Kulhawy, F. H. "Critical Evaluation of Design Methods for Foundations Under Axial Uplift and Compression Loading," Report EL-3771, Electric Power Research Institute, Palo Alto, 1984, 198p.

[2]NAVFAC, Soil Mechanics (DM7.1) Naval Facilities Engineering Command, Alexandria, 1982, 355p.

Undrained Shear Strength of Cohesive Soils

Correlation with Index Parameters for Undisturbed Clays

(I) Skempton[1]:



where S_u = undrained shear strength

VST = vane shear test

$\overline{\sigma_{vo}}$ = effective vertical stress

Note:

(1) for NC clay only

(2) The value of S_u determined from the VST should not be used directly in analysis, because it needs to be corrected for the strain rate during testing and the soil anisotropy.

(II) Jamiolkowski et al[2]:

for low OCR clays with low to moderate PI

$$\frac{S_u}{\overline{\sigma_P}} = 0.23 \pm 0.04PI$$

where $\overline{\sigma_P}$ = preconsolidation stress

S_u corresponds to direct simple shear conditions

---

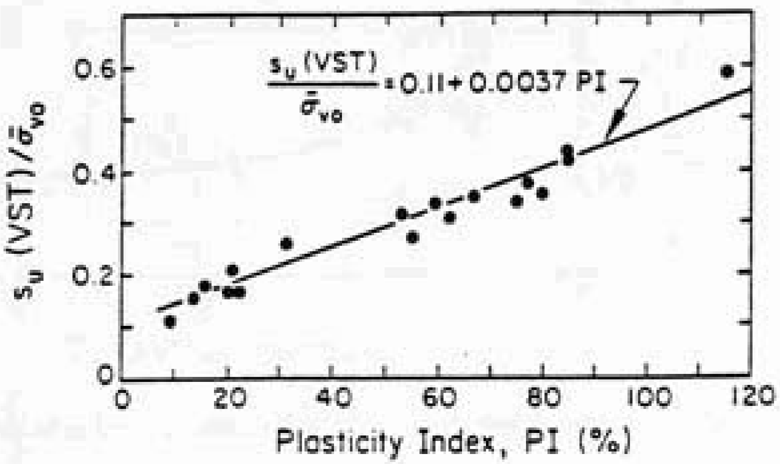
[1]Skempton, A. W. "Discussion of Planning and Design of New Hong Kong Airport," Proceedings, Institution of Civil Engineers, Vol. 7, June 1957, pp. 305-307.

[2]Jamiolkowski, M., Ladd, C. C., Germaine, J. T., and Lancellotta, R. "New Developments in Field and Laboratory Testing of Soils," Proceedings, 11th International Conference on Soil Mechanics and Foundation Engineering, Vol. 1, San Francisco, 1985, pp. 57-153.

Undrained Shear Strength of Cohesive Soils

Correlation with Index Parameters for Undisturbed Clays

(I) Skempton[1]:



where S_u = undrained shear strength

VST = vane shear test

$\overline{\sigma_{vo}}$ = effective vertical stress

Note:

(1) for NC clay only

(2) The value of S_u determined from the VST should not be used directly in analysis, because it needs to be corrected for the strain rate during testing and the soil anisotropy.

(II) Jamiolkowski et al[2]:

for low OCR clays with low to moderate PI

$$\frac{S_u}{\overline{\sigma_p}} = 0.23 \pm 0.04$$

where $\overline{\sigma_p}$ = preconsolidation stress

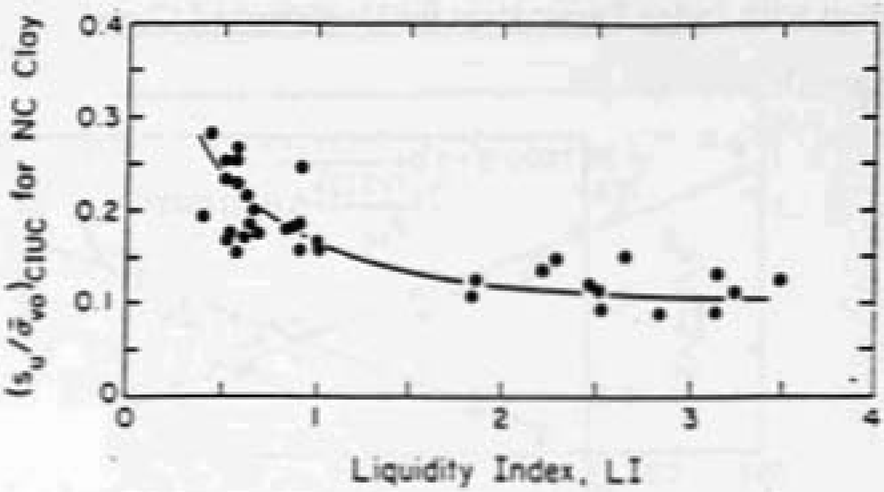
S_u corresponds to direct simple shear conditions

---

[1]Skempton, A. W. "Discussion of Planning and Design of New Hong Kong Airport," Proceedings, Institution of Civil Engineers, Vol. 7, June 1957, pp. 305-307.

[2]Jamiolkowski, M., Ladd, C. C., Germaine, J. T., and Lancellotta, R. "New Developments in Field and Laboratory Testing of Soils," Proceedings, 11th International Conference on Soil Mechanics and Foundation Engineering, Vol. 1, San Francisco, 1985, pp. 57-153.

(III) Bjerrum and Simons[3]:



where CIUC = consolidated isotropic undrained triaxial compression

(IV) Mesri[4]:

$$\frac{S_u}{\sigma_p} = 0.22$$

S_u corresponds to direct simple shear conditions

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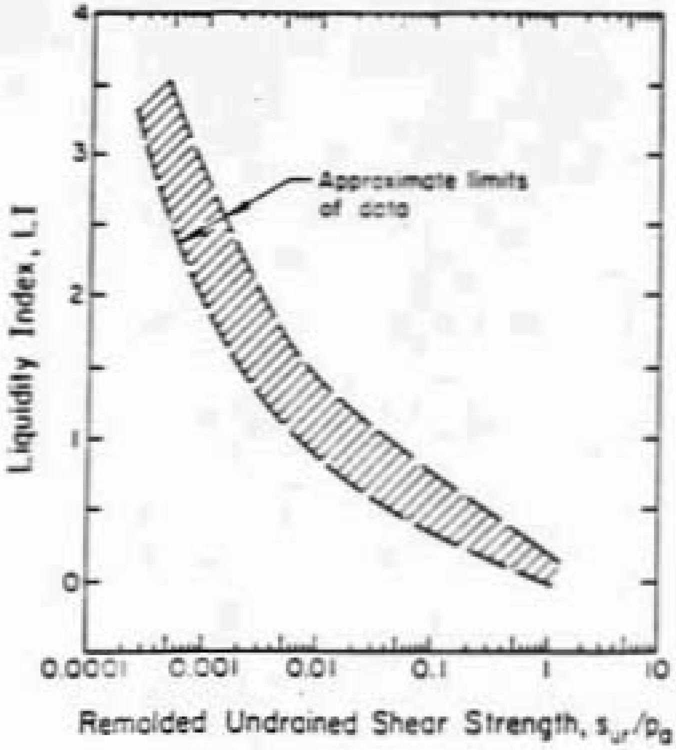
[3]Bjerrum, L., and Simons, N. E. "Comparison of Shear Strength Characteristics of Normally Consolidated Clays," ASCE Research Conference on Shear Strength of Cohesive Soils, Boulder, 1960, pp. 711-726.

[4]Mesri, G. " A Re-evaluation of $S_u(\mathrm{mob}) = 0.22\sigma_p'$ using Laboratory Shear Tests," Canadian Geotechnical Journal, Vol. 26, No. 1, Feb. 1989, pp. 162-164.

Undrained Shear Strength of Cohesive Soils

Correlation with Index Parameters for Remolded Clays

(I) Mitchell[1]:



where S_{ur} = remolded undrained shear strength

P_a = atmospheric pressure or stress

[1]Mitchell, J. K. Fundamentals of Soil Behavior, John Wiley and Sons, New York, 1976, p228.

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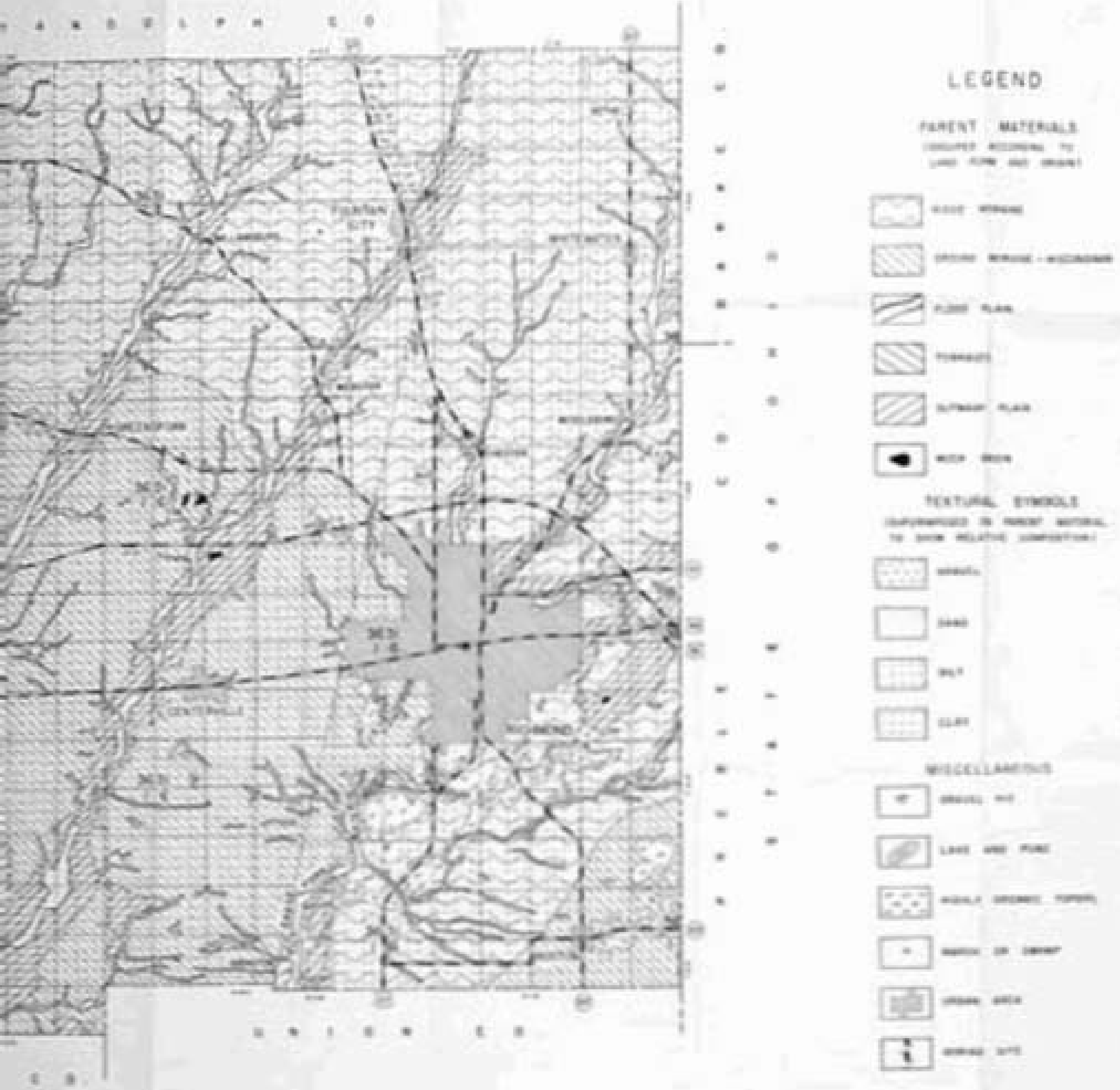
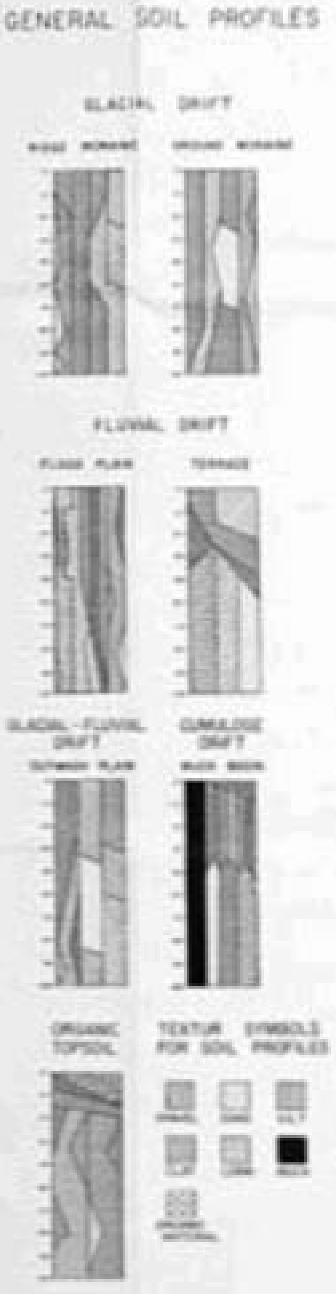


ENGINEERING SOILS MAP
WAYNE COUNTY
INDIANA

PREPARED FROM
1940 AAA AERIAL PHOTOGRAPHS
BY
JOINT HIGHWAY RESEARCH PROJECT
AT
PURDUE UNIVERSITY



ENGINEERING SOILS MAP

WAYNE COUNTY

INDIANA

AAA AERIAL PHOTOGRAPHS

JOINT HIGHWAY RESEARCH PROJECT

PURDUE UNIVERSITY